The NATIONAL GEOGRAPHIC MAGAZINE

Vol. XVIII NOVEMBER, 1907 No. 11

CONTENTS

Queer Methods of Travel in Curious Corners of the World. By Hon. O. P. Austin, Chief U. S. Bureau of Statistics. Illustrated.

Planting Fishes in the Ocean. By George M. Bowers, Commissioner of Fish and Fisheries. Illustrated.

Hunting Big Game in Portuguese East Africa. Illustrated.

A Visit to Lonely Iceland. By Perley H. Noyes. Illustrated.

The Land of Fire. By Herr Jon Stefansson, Ph. D.

Meetings of National Geographic Society.

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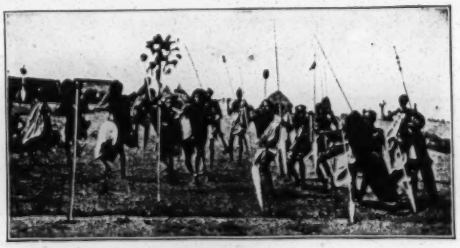

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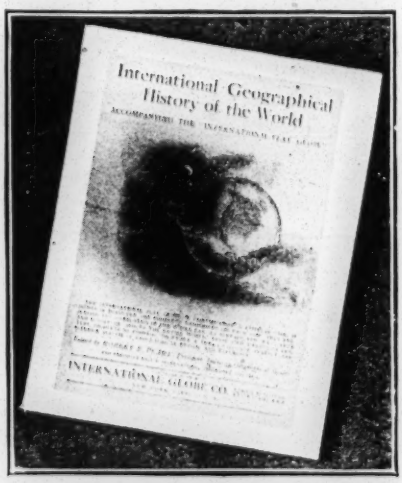

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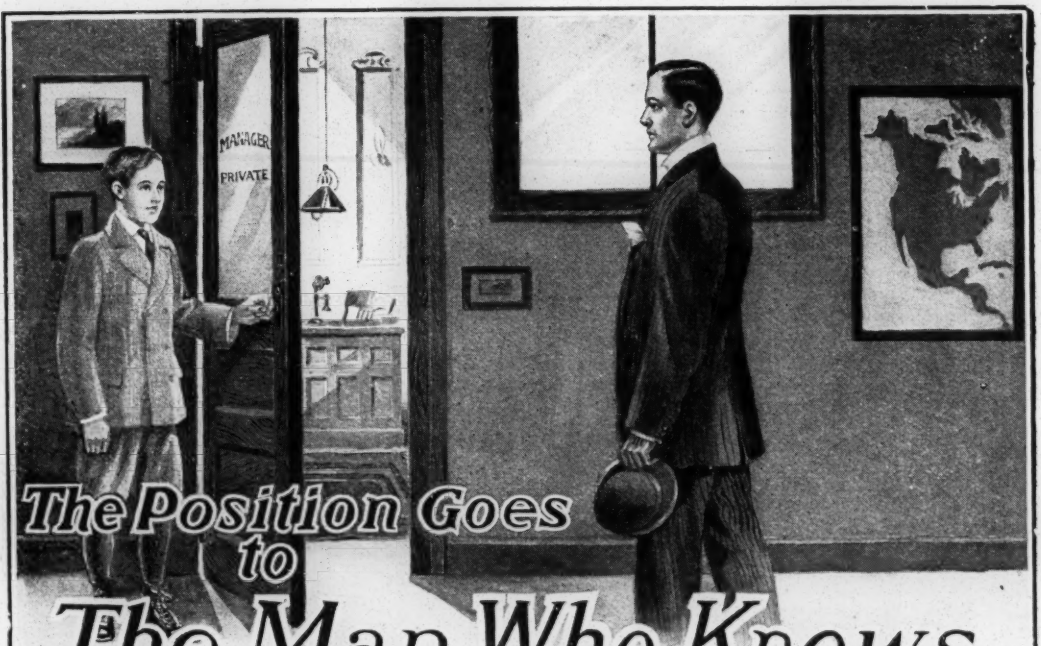

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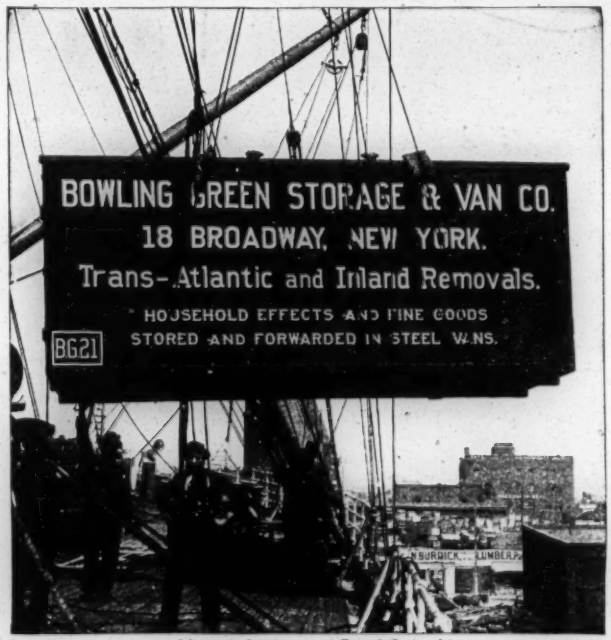
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VOL. XVIII, No. 11 WASHINGTON NOVEMBER, 1907

THE NATIONAL GEOGRAPHIC MAGAZINE

QUEER METHODS OF TRAVEL IN CURIOUS CORNERS OF THE WORLD

BY HON. O. P. AUSTIN

CHIEF U. S. BUREAU OF STATISTICS

NO feature of tropical or oriental life more impresses the traveler from the temperate zone occident than the methods of travel and transportation which greet him at every hand. Whether it be upon the mountains or tablelands of Mexico and Central America, the cordilleras or plateaus of South America, the islands of the Caribbean, the deserts or jungles of Africa, the sandy wastes of Arabia and the Holy Land, the densely populated plains of India, the mountain passes of Tibet, the jungles of Siam, the islands and watercourses of the Philippines, the crowded cities and highways of China, the rugged hills and narrow valleys of Korea, or the coastal cities and mountainous interior of Japan, the methods by which man travels and man's requirements are transported are ever strange, ever changing, ever fascinating. To the man or woman who has been accustomed to travel by the comfortable methods of our own country a marked contrast is found in the burro of Mexico, the llama of South America, the sledges of Madeira, the saddle ox of Central Africa, the camel of the desert, the donkey of North Africa and Arabia, the bullock cart and the "dandy" of India, the yak of Tibet, the trotting ox of Ceylon, the elephant of Siam, the carabao of the Philippines, the wheelbarrow and sedan chair of China, the pack bull and palanquin of Korea, and the jinricksha and kago of Japan. From the moment the traveler leaves the temperate zone countries of the occident and plunges into the tropics of the orient he finds as a poor substitute for that noble animal, the horse, the donkey, the llama, the camel, the elephant, the ox, the carabao, and, finally, man, in those densely populated sections where labor is cheap and land cannot be spared to support animals for transportation.

Of the 100 million horses known to exist in the world, 80 millions, or four-fifths of the entire number, are found in the temperate zone and nearly all among occidental people, while the remaining 20 millions, scattered through the tropics, are largely employed in the service of temperate-zone visitors or residents, and are but feeble representatives of that animal as he is known to the people of Europe or America.

In the United States and Canada we

* Notes from an address to the National Geographic Society, 1907

The "Burro" or Donkey of Spanish America

have 1 horse for every 3½ persons; in South America, 1 for every 7; in Mexico, 1 for every 12; in Japan, 1 for every 33; in Turkey, 1 for every 40; in the Philippines, 1 for every 50; in Africa, approximately 1 for every 150; in India and Southern China, 1 for every 200.

The comparative absence of the horse in the tropics is due chiefly to climatic conditions, and in the orient to the fact that the density of population prohibits the utilization of land for the production of his food. In his place we have, therefore, scattered through the tropical and oriental countries of the world, approximately 3 million camels, 10 million donkeys, and 20 million buffaloes or caribao, and, everywhere that horses are not available, the patient, slow-moving ox.

The llama will carry from 50 to 200 pounds; a man, from 75 to 150 pounds; the donkey, 100 to 200 pounds; an ox, 150 to 200 pounds; a horse, from 200 to 250 pounds; the camel, from 350 to 500 pounds; the elephant, from 1,800 to 2,500 pounds.

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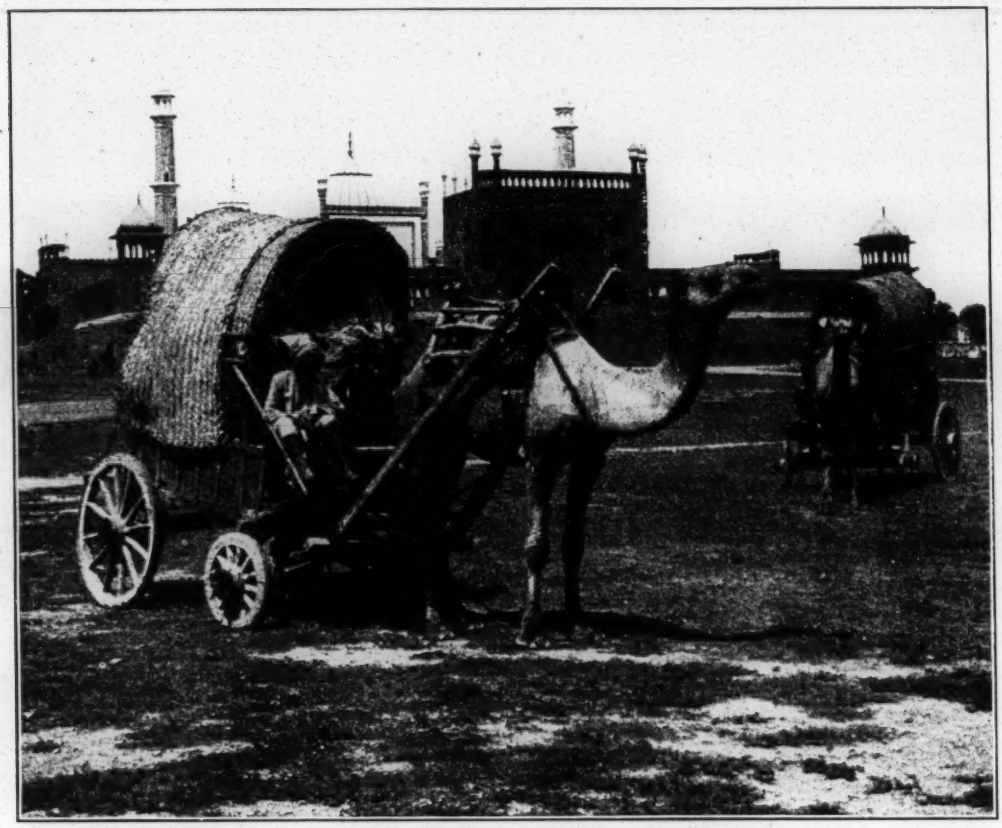

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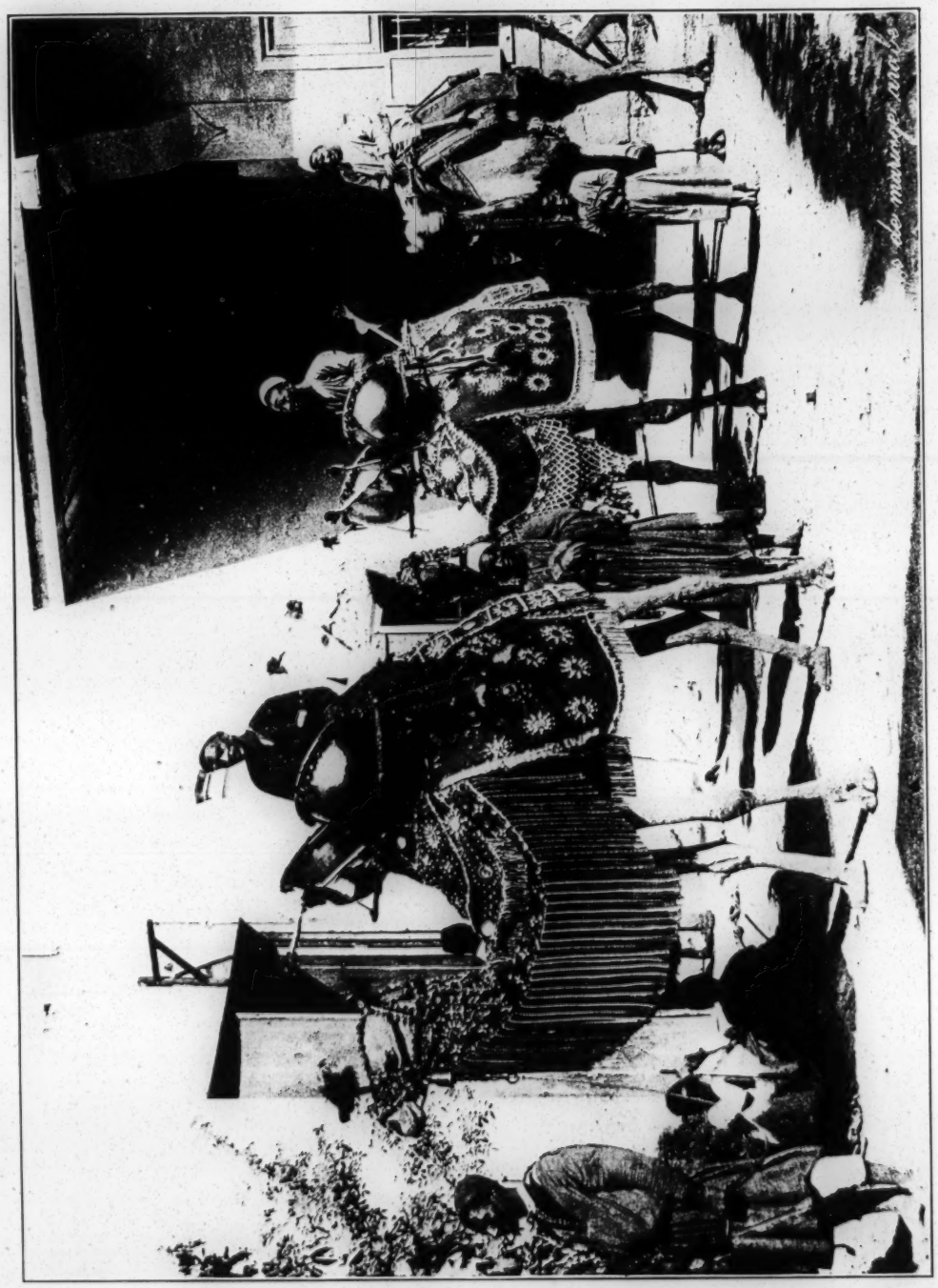
Camel Wagons at Delhi, India

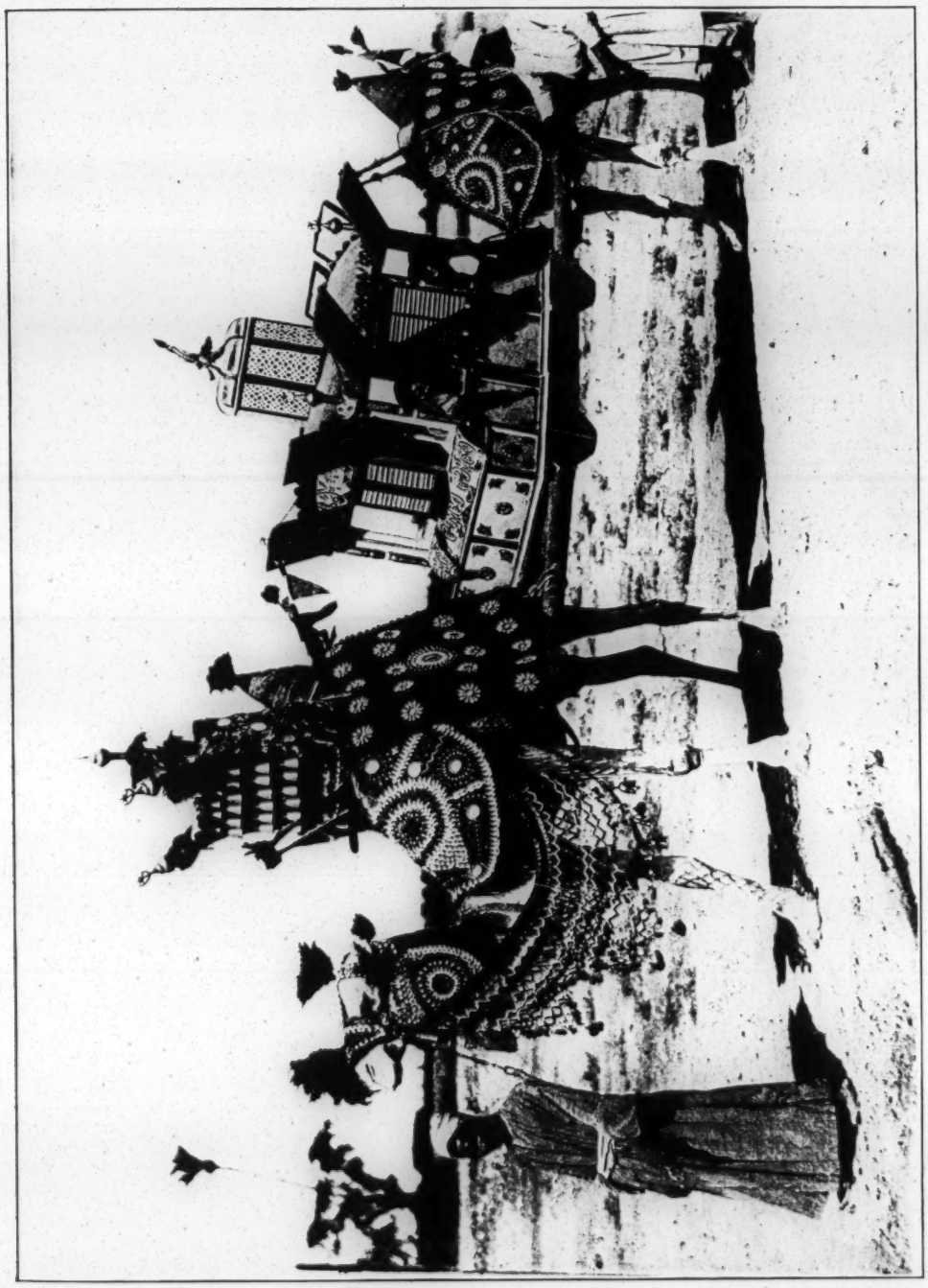
With the scarcity of animal power in the tropics and the orient, man has devised many methods for travel and transportation, and, in many cases, has, perforce, put his own shoulder to the wheel, or his own neck under the yoke, and made himself a burden-bearer and the transporter of not only merchandise, but, in some cases, of his fellow-man.

I confess to you that until I had visited these countries and seen these things with my own eyes I could scarcely realize that the conditions which I had seen pictured were those of the present day; but now that I have seen them in actual existence in this twentieth century, I begin to realize the great disadvantage under which tropical and oriental man has labored in his attempts to develop exploration, intercommunication, and exchange of products, and the great benefits to him, and to geography, to science, and to commerce which would come from some satisfactory device which would do for the tropics and the orient what the horse has done for the temperate zone occident.

Our line of march in observing these peculiar conditions will take us around the world, plunging first into the Spanish-American tropics, thence to Western and Northern Africa, thence for a short tour through Southern Europe, thence via the Holy Land to India, Tibet, the Malayan peninsula, Java, the Philippines, China,



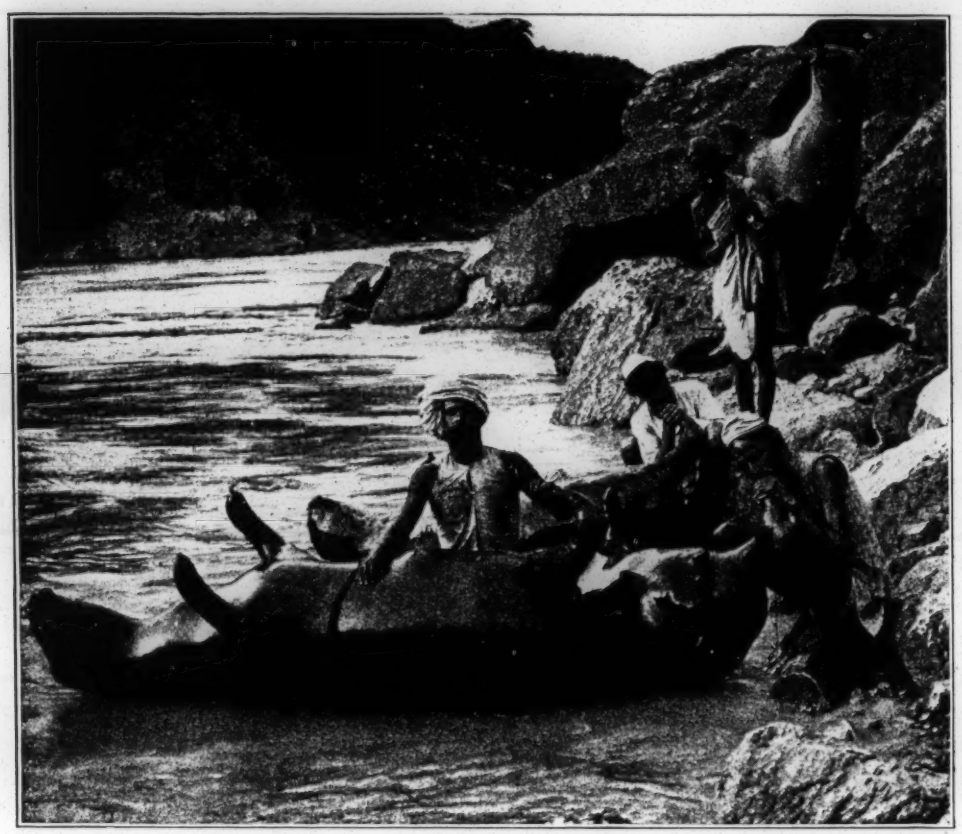
Scene from a Wedding Procession, Cairo, Egypt



The Bride on Her Way to Her New Home, Cairo, Egypt

Photo by O. P. Austin

The Belgian Milk Wagon



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Crossing a River in India on a Raft of Inflated Bullock Skins

Korea, Japan, and returning via Northeastern Siberia and our own Alaska.

At our very first stop in Mexico we encounter the "burro," the Spanish term for the animal which we usually know as the "donkey." The statistical records indicate the existence of about 10 million of these diminutive and patient burden-bearing animals scattered over the world, chiefly in Spanish America, Northern Africa, Arabia, and the Holy Land. Originally domesticated in the Holy Land and Egypt, he was carried to Northern Spain by the Mohammedans, and thence to America by the Spanish explorers and colonizers.

While much used in Spanish-American countries, he is less prized and less cared for than in his original home of Western Asia and Northern Africa, where he is the constant companion of man, returning a reasonable care with faithful service and evident affection for his master.

They are used not only on the mountain roads, where they are more sure-footed than the horse, but also in the towns and cities; the horse in these more populous centers being reserved for the transportation of people.

For transportation over the country roads or in the mountains they are assembled in considerable numbers and march singly, following their leader in a long file known as the "pack train."

Photo by O. P. Austin

A Bullock Carriage Used by Ladies of Rank, India

They travel a distance of from 10 to 20 miles per day, according to conditions of roads, carrying loads of from 100 to 200 pounds each, and, accompanied by their masters in the curious costumes of Spanish America, present a picturesque appearance as they wind in long trains through the valleys filled with tropical verdure.

In many of the mountain sections these pack trains are the only methods yet available for the transportation of ore from the mines to the smelting works or the seaboard.

Further south, in the mountain ranges of South America, where the great altitude and difficult travelling requires an animal especially prepared by nature for these peculiar conditions, the llama is still used in limited numbers as a beast of burden. The llama was the only animal suited for transportation found in America by the Spanish discoverers and explorers; the horse, the donkey, and the ox, which now perform most of the work having been brought originally from Europe. The llama belongs to the camel family, having the same peculiar foot with a divided hoof and cushions placed on the under surface, thus making it especially valuable for mountain climbing and on sandy plains, and having also many of the peculiar habits which characterize the camel.

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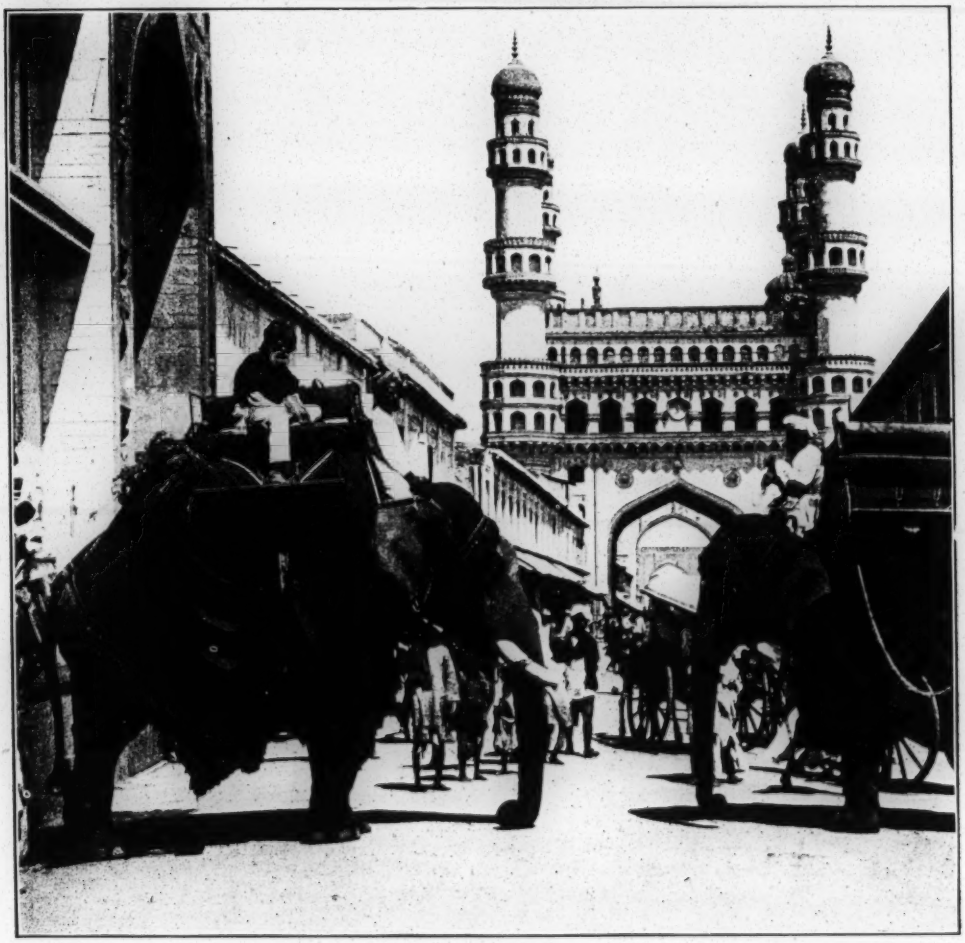
A Hill Country "Ekka" with Passenger and Baggage, India

In all parts of that great line of deserts, stretching from North Africa across Central Asia to Northwest China, the camel is everywhere in evidence; the total number in the world being estimated at about 3 millions.

Here, in the midst of these great waterless areas, we see the camel in all the varied types and in the variety of methods of his utilization. How valuable this strange and always weary-looking beast is to the people of North Africa and Central Asia can scarcely be realized until you see him, as I have, actually performing his service, and realize that he is the only beast of burden able to endure the long marches across the desert.

Costing about as much as a good horse, his speed is equally great, his life considerably longer, and his ability to carry a load equal to that of three horses, while the fact that he can travel for a week, or, if necessary, nearly two weeks without water renders him invaluable to those great sandy stretches. He can also go for several days with little or no food, subsisting meantime upon the fat stored in the humps on his back, which nature seems to have provided as a storehouse for sustenance in case of absence of food.

Not only is the camel a valuable freight carrier, but he serves as the travelling car of the Rockefellers, the Carnegies, the Morgans, and the Harrimans of the des-



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Conveyances in Hyderabad, India

ert. When he is chosen for this more pretentious service, a light framework is placed upon his back and covered with cloths to screen the occupants from the sun and the observation of the passers, and decorated with pompons of varied colors. In this gorgeous compartment, which may be not inaptly termed the "Palace Car of the Desert," the master of the camel train places his wife and children, his choicest merchandise, his cooking utensils, and daily requirements, and travels in state, the observed of all observers, the envy of the wandering native of the desert.

From Africa we pass to that curious section of Southwest France known as the "Landes," consisting of some 5,000 square miles of flat and sandy marshes. The inhabitants are chiefly engaged in cattle raising. The peculiar condition of the soil, composed chiefly of sand and marsh, makes travel by the usual process difficult, and so the shepherds go about on stilts.

In some parts of this formerly unin-

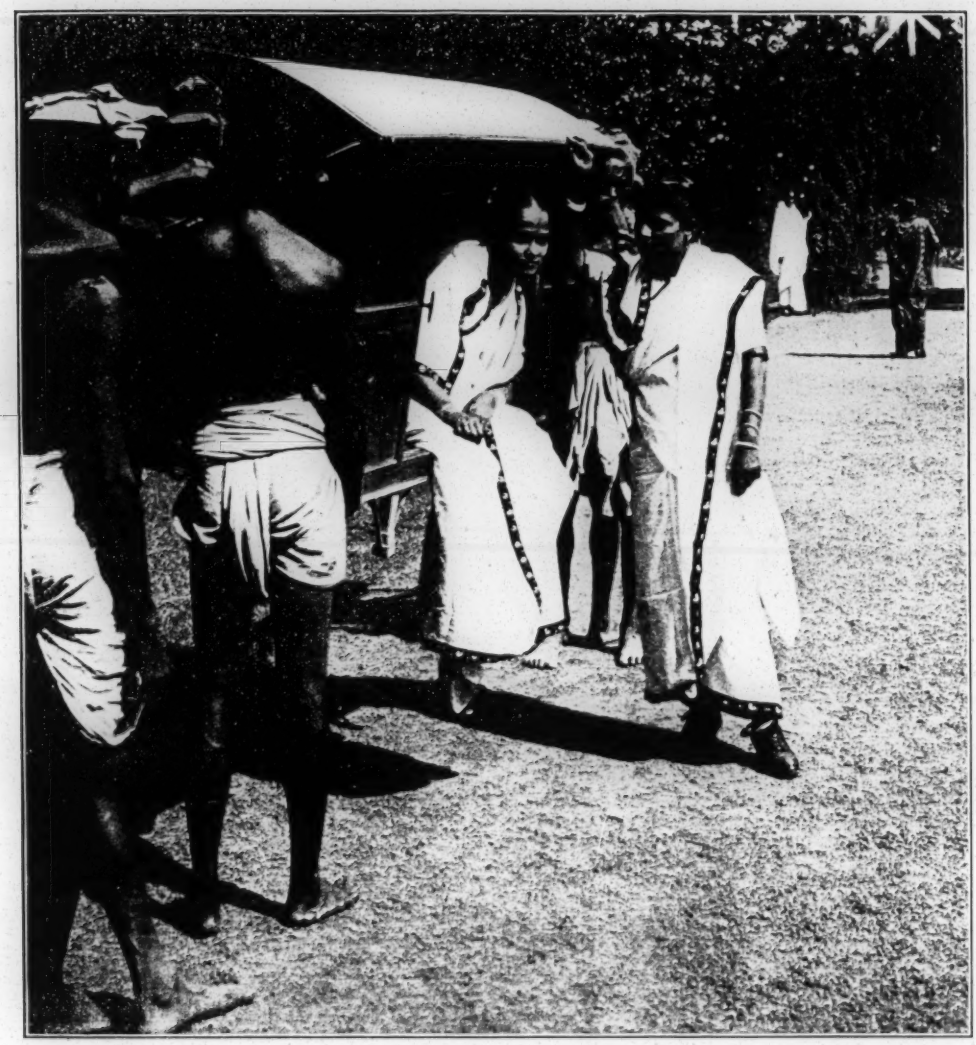


Photo and Copyright by Underwood & Underwood, New York

Morning Ride of a Lady of Calcutta in Her Palanquin

habitable region the lands are being rescued from the drifting sands by the planting of trees, and in other places are being developed by drainage; and so, while the number of inhabitants is increasing, the number of stilts required is growing less.

Of course, we could scarcely omit the Belgian dog cart in this discussion of queer transportation methods, for, while the use of the dog for labor is gradually being abandoned in most other countries, the Belgians still cling to the custom.

One of the queer transportation methods which modern civilization has furnished is the single-rail railway which runs from Elberfeld to Barmen, Germany, carrying its passengers and freight in cars, suspended from wheels which run

A "Push-Push" of India. Photo by Rev. T. S. Wyncoop, of Allahabad

A very common means of travel, the cart being pulled by men for hundreds of miles

on a single rail, supported by a framework, and operated by electricity generated many miles from the place at which it is applied to the propulsion of the cars.

Nor could we, in this discussion of queer transportation methods, pass Venice, that city without a single horse. I am not sure that this description of Venice as an *absolutely* horseless city is literally true, though I was solemnly assured while there that there was not a single horse in the city; but certainly there are but very few, if any, and the horse on their streets would be quite as great a novelty to the Venetians as a gondola on the Potomac would be to us in Washington.

In the Holy Land the donkey is in evidence everywhere and furnishes the chief method of transportation.

His availability for application to all kinds of transportation, whether for people or merchandise, coupled with his small cost and limited requirements for food, render him especially valuable to the people of this section.

We now bid adieu to the donkey and the camel and will review some other curious methods which still prevail on the rivers which flowed past the Garden of Eden. On the Euphrates and the Tigris are still retained the curious water transports of centuries ago—the raft of skins and the circular boats. These rafts are sustained by inflated skins, prepared for this especial purpose, and after the raft floats down the river to its destination the inflated skins are removed, the air permitted to escape, and the skins carefully folded and carried back to the upper waters, where they are again inflated and used as the support of another, and still another raft.

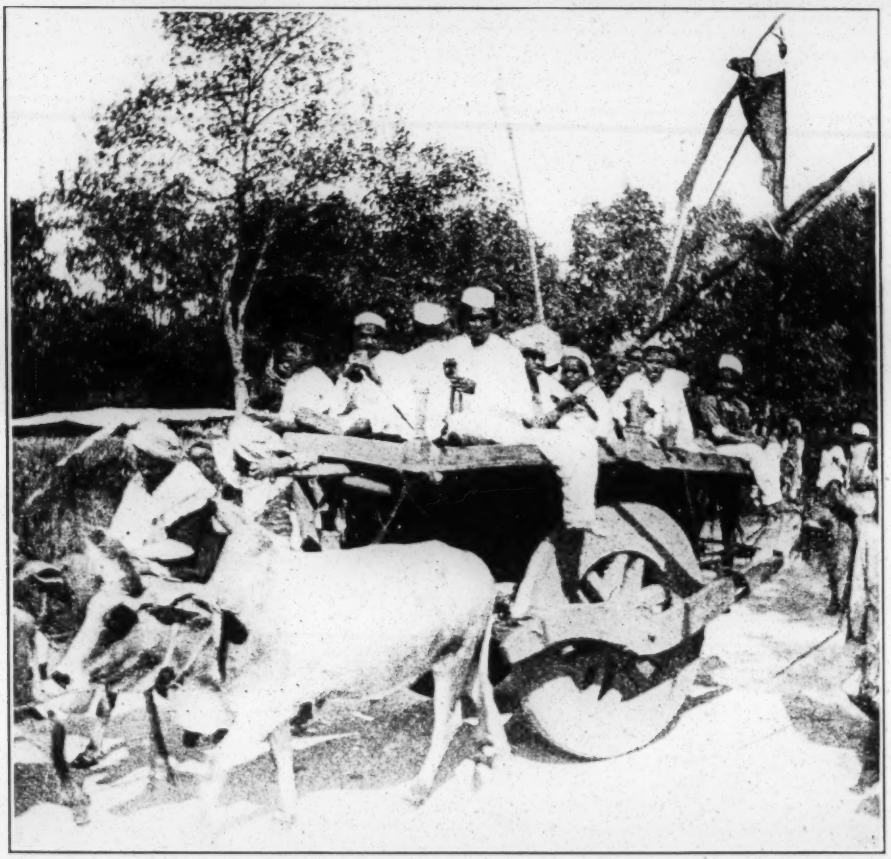
Even more curious, to the eyes of the traveler from other parts of the world, are the circular boats, made of wickerwork and covered with skins, or made water-tight with pitch, which are still in daily use on the Tigris and Euphrates Rivers. These curious little vessels are used for the transportation of both passengers and freight, and the skill with which they are managed by those accustomed to their use is quite surprising and interesting. Just how they get animals in and out of these courious vessels seems a little puzzling, though it is probably no more difficult than the methods by which cattle and horses are lifted from a lighter and deposited in the hold of the modern steel steamer.

No feature of life in India is more striking than that of the methods of transportation. From the moment you put foot on the land you find a bewildering variety of vehicles, most of them drawn by the humped ox, known in our zoölogical gardens and menageries as the "sacred ox."

The elephant is still used to some extent in India, Burmah, and Siam, though in these sections in which roads have been developed his place has been taken by the ox and other methods less expensive.

The large quantities of food required by the elephant make him available only in the comparatively undeveloped sections, where heavy work is required in handling timber, or in the military service. His ability to carry heavy loads, how-

Carts with Bamboo Covers, Ceylon. Photo by S. A. Knapp



Young Men Riding to a Mohammedan Festival Allahabad, India. Photo by Rev. T. S. Wyncoop

Coolies in the Himalaya Mountains Bringing Hay to Market. Photo by Rev. T. S. Wyncoop, Allahabad.

ever, still leads to his use in certain sections, for he can easily carry a ton at a single trip and maintain a speed of about four miles an hour in a climate in which horses are comparatively useless.

The method of conveyance by a pole supported on the shoulders of men is very common throughout India, and is known as the "dandy."

From India onward we find an increasing use of man for the transportation of both merchandise and people, due chiefly to the cheapness of labor and the density of population, which precludes the use of land for producing food for animals.

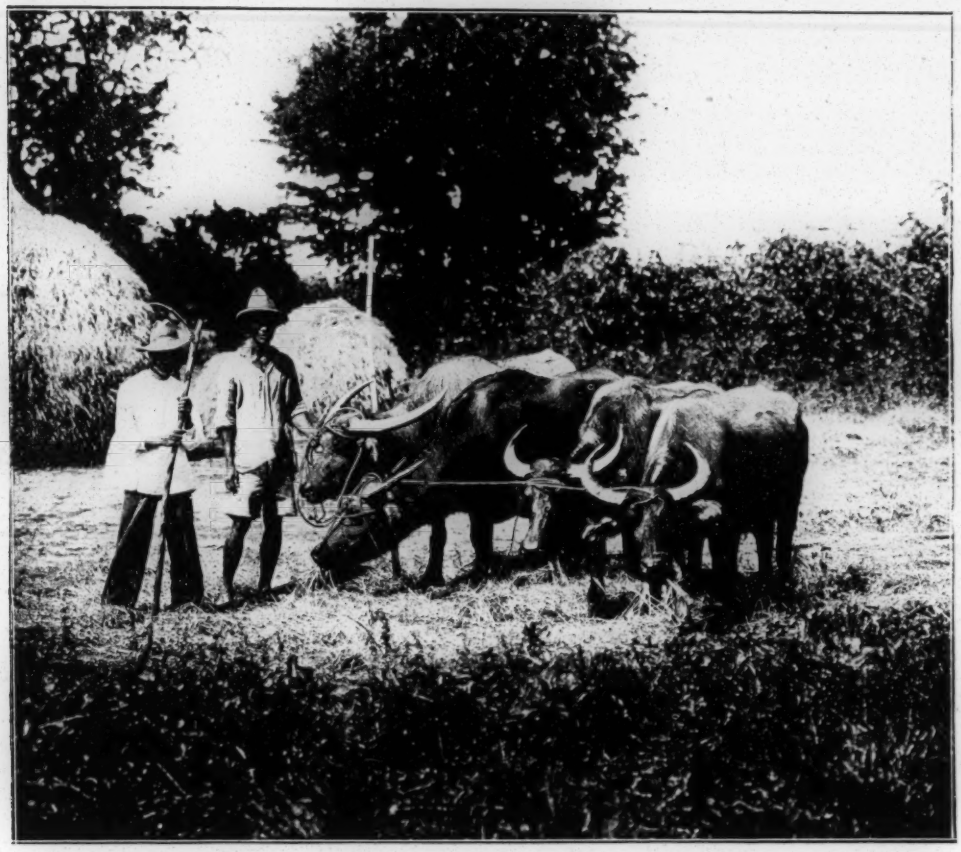
In Ceylon we get our first glimpse of the jinricksha, which competes with the famous trotting oxen of the island. The trotting ox is trained to fast traveling, and when attached to light carts and driven by experienced men makes a speed which is quite marvelous.

In Ceylon we also see for the first time the peculiar boat with outriggers, which is found in various forms among our Samoan, Philippine, and Hawaiian neighbors. The boat is very narrow, and is steadied by the long outrigger, to which is attached a pole, which rests on the surface of the water. I well remember my first experience in riding in one of these narrow boats from the dock at Colombo to the steamer lying off in the harbor, and I must admit that I had a better opinion of the boat and the boatman after this practical test than I had before.

Another type of boat in use in the Philippines has double outriggers, one set at each side. These boats are found in the waters of practically all parts of the Philippines and of our Pacific islands.

On page 701 is an illustration of that useful animal the carabao, or water buffalo, which forms so important a factor in the agriculture and transportation of the extreme Orient. Originating in India, the carabao has been transported westward as far as Egypt and eastward through the Malayan peninsula, China, Indo-China, and the islands of the Indian Archipelago. The number among the oriental people is estimated at fully 20 millions, and you will find them in greater or less numbers all the way from Egypt to China. Costing about one-half as much as an ordinary horse, they perform all the services usually required of that animal, and their extreme deliberation in movement is compensated for in the fact that they can endure the heat of the tropics, while their fondness for water and mud renders them especially useful in the flooded rice fields and on the muddy roads during the rainy season.

They are used in every way that the horse is used in the temperate zone; attached to sleds, to carts, to drays in the cities, to carriages, and as saddle animals. Their thick, brown skin, almost devoid of hair, gives little heed to the whip, yet they are docile, patient, friendly with the



Carabaos Threshing Rice in the Philippines

natives, but unfriendly to the white man, and of great service to the Filipino, both on the farms and the roads.

In the towns and cities you see them everywhere, drawing heavy loads on carts and drays, standing patiently in the broiling sun, if they can but have an opportunity once or twice a day to wallow in the water and mud of some nearby stream. Without an occasional opportunity to submerge themselves in water they soon become unmanageable and even dangerous to those about them.

While their chief service is for agricultural work and the hauling of heavy loads, they are sometimes attached to carriages, where horses or ponies are not available, and this is not infrequently the case, for the number of horses and ponies in the islands is but about 150,000, while the number of carabao is nearly one million. There is no "speed limit" for the carabao carriage.

One of the common methods of transporting water in the Philippines is given on page 703. The long bamboo pole carried on the shoulder of this girl is filled with water. The bamboo is prepared for this service by punching out the sheets of light material which divides it into sections at the joints.

In China we find less of animal transportation and much more performed by man power, and this is especially true of Southern and Central China. At the north, where the climate is that of the

Tagalog Boys Carrying Vegetables to Manila

temperate zone and the population less dense, there are horses, though in small numbers as compared with similar conditions in the occident. The street scenes on page 706 show the various methods utilized in the coast cities and the interior. We have here the jinricksha pulled by men, the wheelbarrow, and the coolie porter. The coolie porter is seen everywhere, carrying loads of from 150 to 200 pounds, divided between the two ends of the bamboo pole, stepping briskly along the street or road, chanting a curious sort of cry, which he imagines helps him to more readily endure the fatigue of his burden.

The three principal methods of transportation of people in Central and Southern China are the Sedan chair, the jinricksha, and the wheelbarrow. The Sedan chair gets its name from the fact that it is modeled after a type once used by the aristocracy of the city of Sedan, France. They are much used in Hongkong, because the steepness of the mountain side on which most of the foreign residents live make the use of the jinricksha extremely difficult. In the narrow streets of the native quarters of the great cities they are the only available method for transportation of people, except that of the wheelbarrow, and in the crowded sections it is only with the greatest difficulty and by the aid of the warning shouts of the bearers of the chair, or the runner who precedes them,

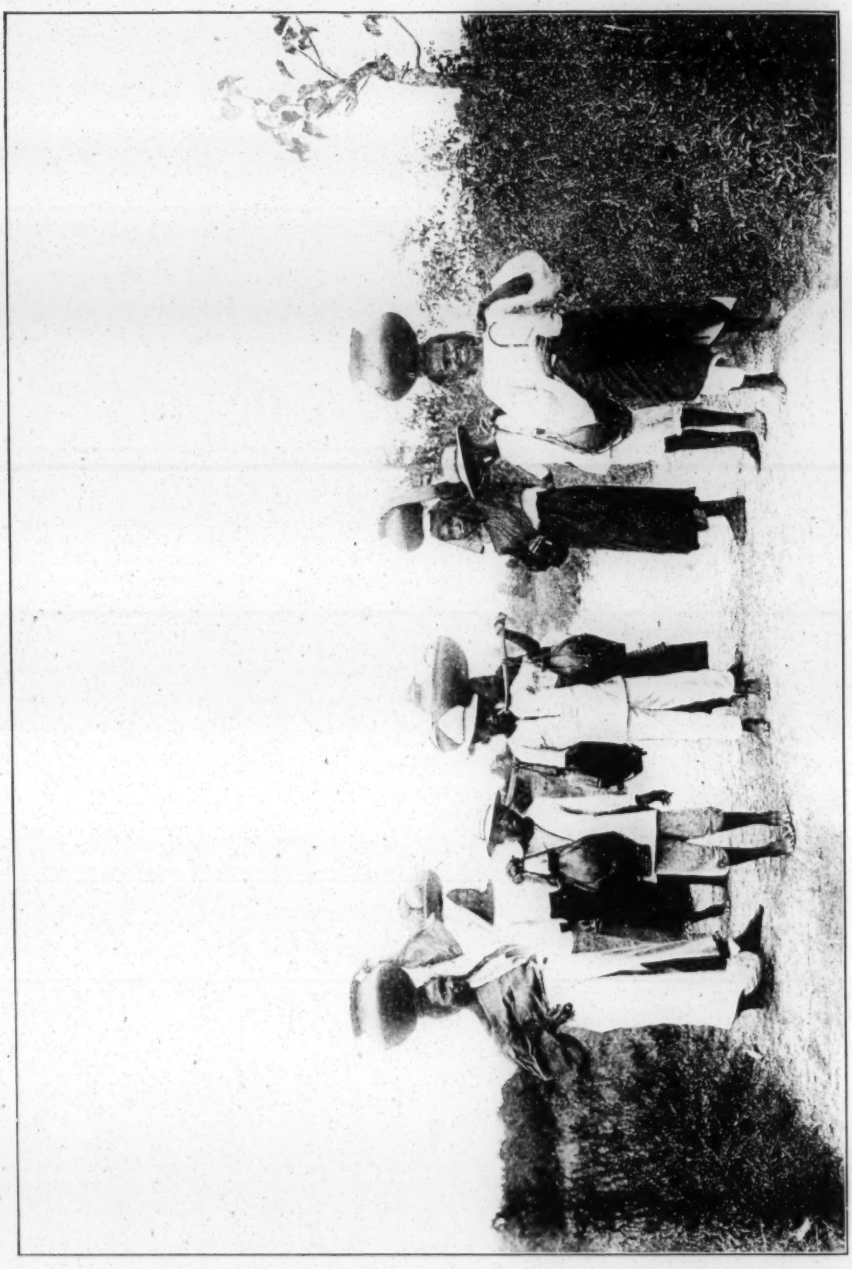
Photo and Copyright by Underwood & Underwood, New York

Carrying Water in Bamboo Tubes, Philippine Islands

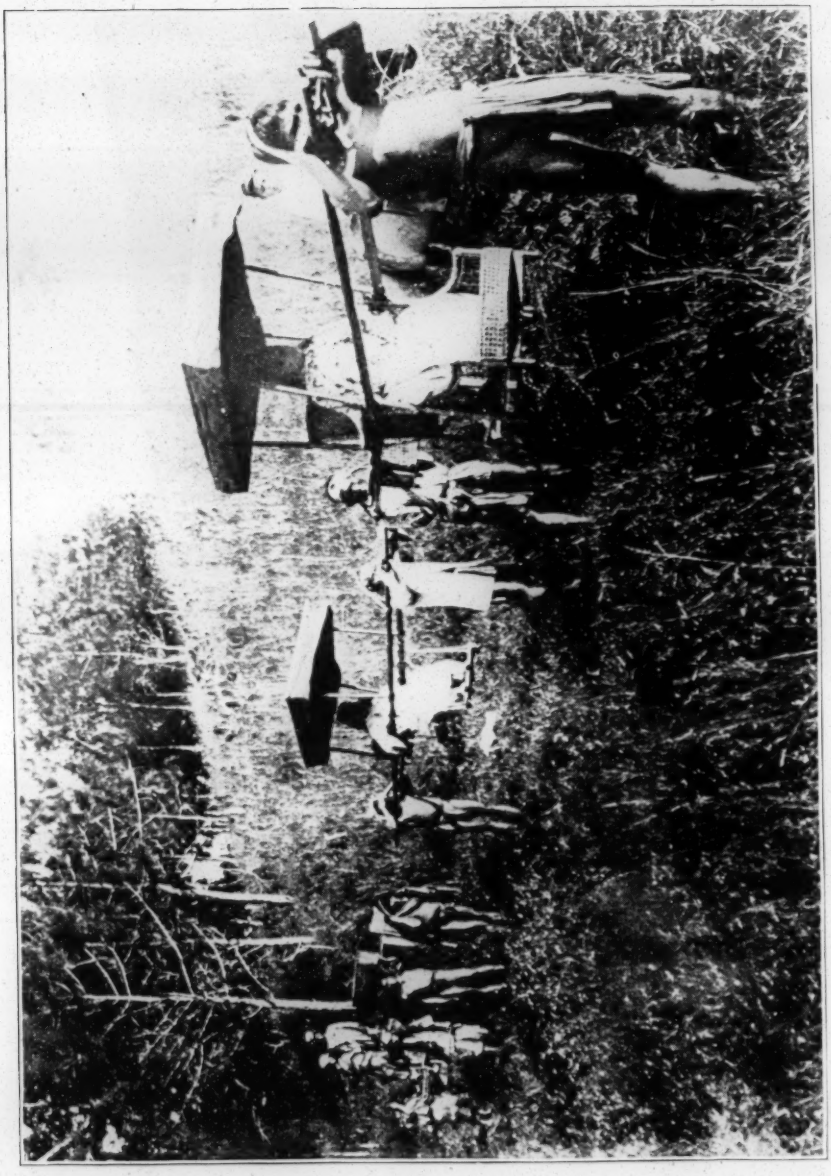
that the mass of humanity is induced to give space for its passage.

The more expensive type, and that most affected by the wealthy and exclusive of the Chinese, are enclosed with lattice work, and, while the open type is more convenient for sight-seeing, those having the screen at the sides and rear have their advantages in the crowded native quarters, since the occupant is partially screened from view and less liable to have his progress interrupted by the crowd of curious natives, which always gathers at the sight of an American or European traveler in the native quarters. Even in these, however, the traveler is not always free from observation, for it was while riding in a chair of this general type that the German Minister, Baron Von Kettler, was attacked and killed during the Boxer riots in Pekin.

The sensation of riding in a Sedan chair is not an especially agreeable one. It is placed on the ground for the passenger to enter, the coolies take their places at the end of the poles, and at a signal given by the man in the rear the chair is lifted until the poles rest on the shoulders of the men. Then they start off at a quick pace, winding their way through the crowds, jostling, shouting, halting, and again starting as the crowd gives way; and, unless they keep step, which they seldom do, the swaying, tee-



Carrying Milk to Manila



Traveling in Luzon, Philippine Islands

Wheelbarrow Carrying Freight and Passenger, Shanghai. Photo by O. P. Austin

tering motion imparted to the chair by the long flexible poles on which it rests is anything but agreeable to the inexperienced.

Probably more freight and more passengers are transported in China by the wheelbarrow than by any other land method. The wheelbarrow there used differs from that used by us, in the fact that the wheel is set in the center and thus supports practically the entire load, while the handles are supported in part by a strap or rope over the shoulders of the man who operates it. As a result, the wheelbarrow coolie in China will transport nearly a half ton on his vehicle.

Wheelbarrows are much used in the country, where the roads are but little developed, and it is said that passengers sometimes make the entire trip from Shanghai to Pekin, a distance of 600 miles, by barrow. A two-passenger barrow will make about 20 miles per day, and the coolie is content with a pay of about 20 cents per day, or an average of about one-half a cent per mile for each passenger, or about one-fourth of the low passenger rate recently fixed for the railroads by several of the States of this country. Yet, I presume, most of us would prefer to pay the two-cent rate in a comfortable passenger coach

Street Scene in Hongkong. Photo by O. P. Austin

A Dray Seen on the Streets of Shanghai. Photo by O. P. Austin

than the one-half-cent rate on the wheelbarrow. On the level, well-kept streets of the foreign quarters of such cities as Hongkong, Shanghai, and Pekin, the wheelbarrow coolie will struggle along with a load of 6 or even 8 people.

Other strange methods of transportation in China are the junks, sampans, house-boats, and river crafts, which crowd the rivers, harbors, and canals of that densely populated empire. Many of them have peculiar marks, resembling an eye, painted on either side of their bows, which, I found on inquiry, were really intended to represent eyes, and are provided in the firm belief that they actually aid the vessel in finding its way.

The junks and sampans are the freight carriers along the coast and in the harbors.

House-boats are found everywhere, but especially in the waters adjacent to the great cities, and it is estimated that several millions of the people of China have no other home than these floating residences. They are supplied with the simple requirements for cooking and daily life of the home, the pig sty at the rear, the tiny flower garden at the front or upon the roof, and are often sculled from place to place by the mother, with her children playing about her and her youngest strapped upon her back. I have often seen these Chinese and Japanese boat women sculling their boats about the harbors, halting at the sides of vessels and clamoring for employment, meantime hushing the cries of the babies on their backs by a peculiar shuffling, swinging motion of the body as they scull the boat or shout their offers of service.

In Korea the bull, the donkey, and the chair coolie vie with each other as burden-bearers, though the donkey is more reserved for long distance travel in the mountainous regions. The chairs are not unlike the palanquin of India or the Sedan chair of China. In most cases they are carried by straps or ropes attached to the ends of poles and passing over the shoulders of the coolies.

Official chairs are usually carried by four and sometimes eight porters, and are by

Transportation by Man Power, Yokohama. Photo by O. P. Austin

far the most comfortable method of travel in Korea. A team of good coolies will take you over the country at the rate of four miles per hour, sixteen hours at a stretch, thus enabling you to make over 60 miles in a single day, provided you are willing to endure your share of the fatigue by sitting cross-legged in the box for that length of time.

Japan is said to be the home of the jinricksha, which it is claimed was invented by an ingenious American missionary. Whatever may be the true story of its nativity, it is no longer peculiar to that country, for you see it everywhere along the Asiatic coast, from Ceylon eastward to Vladivostok. While the jinricksha is the popular mode of conveyance in the coast cities and on the level country roads of Japan, it will not serve in the mountains, which abound in every part of the interior. There its place is taken by the "kago," which is quite similar to the "dandy" of India.

Even in the most occidental of all the oriental cities—Yokohoma—where contact with western methods has induced the adoption of many of our customs, man power is still the principal factor in transportation.

As we leave Japan our steamer must be again coaled, for Japan furnishes the chief coal supply of the orient at the present time. The coal is brought alongside the vessel in open barges; a series of platforms built out at the side of the vessel, each one about 4 feet higher and 3 feet narrower than the one next below, looking like a big flight of steps up the side of the vessel. Then a Japanese man or woman is stationed on each of these steps, and a lot of men and women in the barge below, and supplied with scores of small baskets, holding not to

exceed a half bushel each. These they fill with the coal, and they are passed by hand, one at a time, to the person stationed on the first of the platforms, and he passes them, one by one, up to the person on the platform next above him. Thus, hour after hour, a steady stream, or perhaps several streams, of these baskets flows up the side of the ship, passed from hand to hand, men and women working together indiscriminately and emptying barge after barge until the vessel has received its requisite supply. But it is a slow method at the best, and I well remember the experience of lying for two days in a broiling sun, just off Shimonesiki, waiting for a multitude of Japanese men and women to perform a service which might have been performed in an hour by the appliances in use in the United States. Here a great crane, operated by steam or electricity, picks up a car carrying perhaps 50 tons of coal and pours its contents gently into the hold of the steamer lying alongside.

The picture of the mail-carriers in Alaska (on page 710) illustrates the extent to which the reindeer has become a factor in the life of that section, due to the foresight and energy of Dr Sheldon Jackson.

And now, as we return home to our land of the horse, the trolley car, the railroad, and the horseless road vehicle, and contrast our own conditions of travel and transportation with those of the tropics and the orient, I want to suggest the possibility of the extension of certain of our transportation methods to those countries, and the development of prosperity which may result.

Clearly the conditions of transportation in the tropics and the orient are due, in part at least, to the absence of that noble animal which has so served us in the temperate-zone occident—the horse. He has rendered possible the development of Europe and America by transporting the product of the farm, the mine, and the factory to the common carriers—the ocean, the river, the canal, and the railway—and to the sections thus developed has come great prosperity. In the tropics, where the horse cannot endure the climate, and in the densely populated orient, where land cannot be spared to supply him with food, the facilities for transportation to a common carrier are inadequate; the common carrier is therefore not provided, and there is sluggishness, lack of production for exchange, lack of commerce, lack of prosperity. True, rivers do exist in those countries, and railroads can be built; but if they lack some satisfactory means of transporting the natural products from the place of production to that common carrier, the carrier will not be supplied, the farm will not be developed, the mine will not be opened, the factory will not be built, and that prosperity which comes from a ready market for products cannot prevail. As a result, the horseless areas of the world have remained undeveloped and unprosperous, while the area supplied with the horse has developed and become extremely prosperous.

Now comes the final question, whether the ingenuity of man has provided any substitute for the horse, which can be utilized in those areas where the horse cannot exist because of climatic conditions or lack of space for the production of his food. To this question I think I may answer in the affirmative. For many years man has been experimenting in attempts to transport merchandise and men by some machine which carries within itself its own propelling power. He learned a century ago that he could do this on the water by the steamship. Then he soon learned that he could drive a wheeled vehicle on land by power produced within itself, provided he supplied it with an iron or steel track on which its wheels might run, and with this knowledge the railroads spread over all of that part of the world where horses could be found to bring the product to their stations.

But until the beginning of the twentieth century man had not solved the problem of operating self-propelling vehicles on ordinary dirt roads or across stretches of

Reindeer Carrying U. S. Mail, Alaska. Photo from Wm Hamilton, Bureau of Education

country in which no roads exist; but that art has at last been attained. The introduction of the bicycle brought the rubber tire, and the application of the rubber tire brought a self-propelled vehicle which could be operated on country roads—the automobile. Then came the development of the freight motor, which would carry heavy loads of merchandise over the ordinary highways and even over sections where no roads exist, and today thousands of horseless vehicles are moving hundreds of thousands of tons of merchandise over roads of a type which can be supplied everywhere, in the tropics or the orient, as well as in the temperate zone or the occident.

AUTO TRUCKS

The possibility and practicability of applying the self-propelling vehicle to the transportation of merchandise and people in deserts, in the tropics, and the orient has already suggested itself, and the experiments made have already assured success.

In the deserts of New Mexico and Arizona motors are successfully carrying freights in a temperature of from 120° to 140° in the sun, where, owing to the extreme heat, horses or mules can only be used at night. In Nevada a single motor truck is now performing the work of 30 horses, carrying freight over 100 miles of mountain roads. In California a train of motor cars is carrying over dirt roads in the mountain regions as much ore at each trip as would require 200 pack horses for its transportation. In Porto Rico a line of three motor vehicles, established to carry passengers and mails, performs the work for which more than a score of vehicles and over 100 horses had been required. Numbers of American motor vehicles for carrying heavy loads have been put on the roads of Cuba and Santo Domingo with success, and more are being ordered. In Honduras motor trucks are conveying minerals to the seaboard from the mines 100 miles inland, a single motor performing in one day as much work as could be performed by 100 mules in the same time.

In South America the horseless vehicle is carrying passengers and freights to the inland cities over roads where only the donkey was utilized, and doing so at an enormous saving of time and expense.

In Egypt the freight and passenger motor is beginning to take the place of the camel; hundreds of horseless vehicles are in operation, some of them over long stretches of desert, and roads are being constructed through the desert, on which the product of certain mines will be brought to market. In Turkey motor cars are making regular trips over country roads, carrying both freight and passengers. In India motor cars are being imported at the rate of nearly two million dollars' worth per annum, and put

XUM

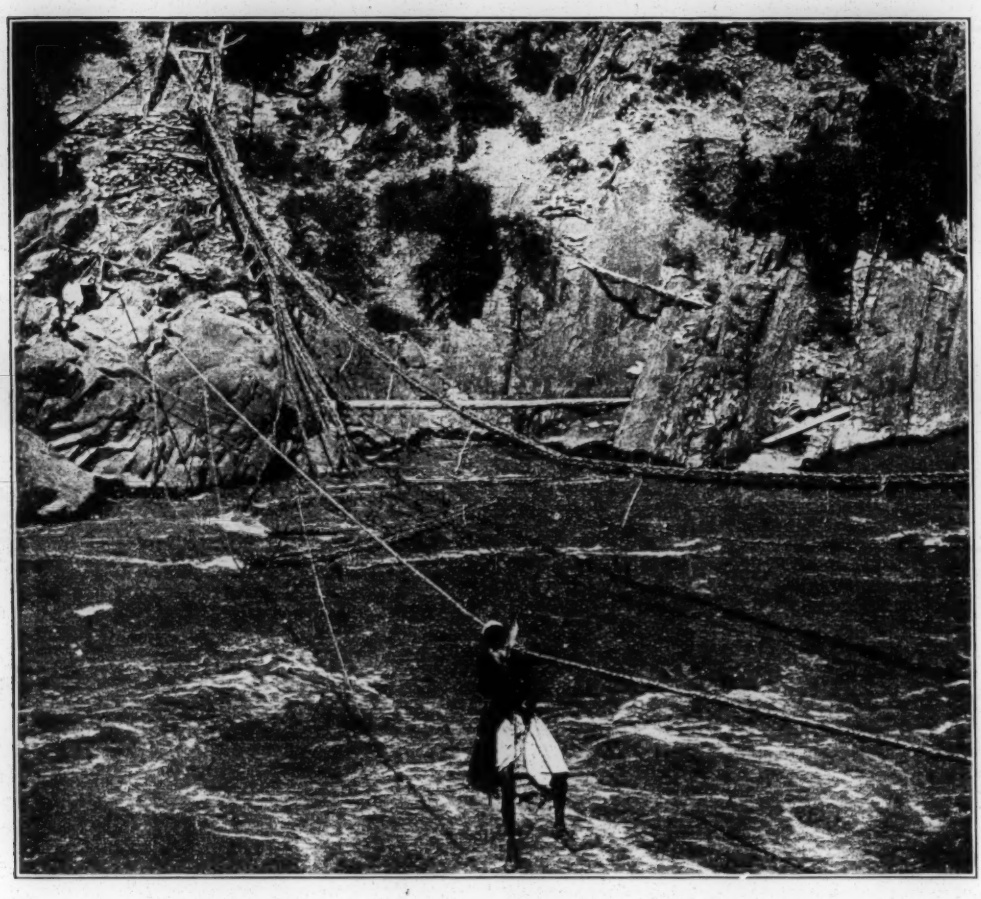


Photo and Copyright by Underwood & Underwood, New York

Crossing the Thelmu River by a Bridge of One Rawhide Rope, Uri, India

in service on the country roads as well as in the cities and towns; a company has been organized to manufacture motor cars, and our Consul General reports that the Indian government is considering the desirability of utilizing motor transport wagons for moving the products of the out-of-the-way districts to market. Special Agent Crist reports to the Department of Commerce and Labor a rapidly increasing use of the horseless vehicle in South Africa, especially in the mining regions; that trains of freight wagons are now being hauled by steam motors over stretches of country where no roads exist, and that the cost of constructing motor roads where they are required is only about one-eighth as much as that of railroads. In the Kongo the Belgian government is constructing hundreds of miles of road, for the use of the motor, which is to be applied to the transportation of freights.

In Java an American horseless vehicle is now being used for the transportation of mails over the country roads. In Japan the experiments with the horseless vehicles have been so successful that a company has recently been organized to build and operate horseless vehicles for a

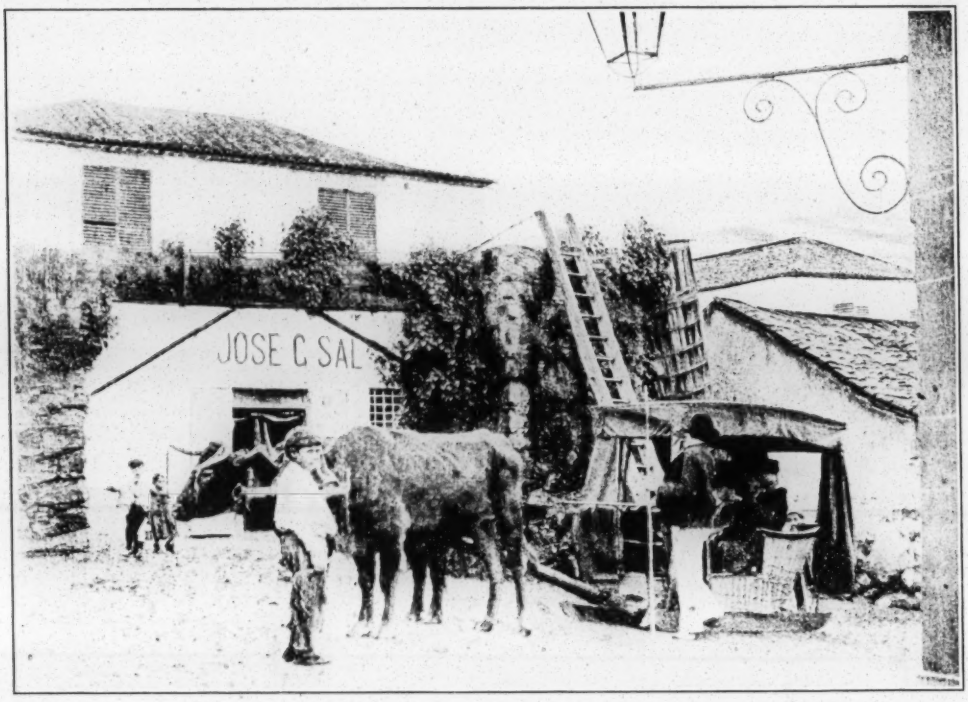


Photo from David Fairchild, U. S. Dep't of Agriculture

A Carriage in Madeira, where all Conveyances are Sleds

general transportation service to Tokyo and thence to the surrounding towns. In the Philippines a line of motors is about being put in to carry passengers on certain country roads, pending the completion of the railway, for which contracts have recently been let.

A special type of vehicle, made in Paris, has now trains of horseless freight and passenger trucks operating in France, Belgium, Germany, Turkey, Servia, Bulgaria, Algeria, Central Africa, Chile, and Peru.

And, finally, so confident are those acquainted with the horseless vehicle and its ability to operate in the tropics and the orient, that a race of motor vehicles from Pekin, China, to Paris, France, a distance of 9,000 miles across the desert and through countries in which the camel is now the chief carrier, has actually taken place, more than a score of vehicles having entered the race.

Horseless vehicles may be operated by steam, by gasoline, by alcohol, or by electricity, and the material with which to supply this power is available in tropical as well as temperate-zone countries. Today great steamships are running from Borneo, in the tropics, to the ports of Western Europe, traveling a distance of 12,000 miles without a single stop, with power generated by liquid fuel drawn from the oil fields of Borneo; while in practically every section of the tropics, except the deserts, are available millions of horsepower in its water-falls, which may now be utilized, since man has at last learned to transmit that power from the place of production by wire and utilize it for operation of railways, trolley roads, or even horseless vehicles.

A Market Camel being Unloaded on a Sidewalk in Cairo, while Pedestrians Walk in the Street. Photo by O. P. Austin

I know that the query which will arise in your minds will be, "How can you successfully and profitably operate horseless freight vehicles in countries where there are no roads, as is the case generally in the tropics and the orient?" To this I reply, that if the freight-carrying vehicle is supplied, the roads will be constructed. A hundred years ago the roads of England were so bad that it took two days and three nights of incessant travel to go from Manchester to Glasgow; and at the beginning of the last century the time required for a trip over the bad roads from Philadelphia to Baltimore was often 5 days, or as long as it now takes to cross the continent. The fine roads of Europe and whatever we have of good roads in the United States have come chiefly in the last century in answer to popular requirements. The feasibility of making and maintaining good roads in the tropics is shown by the fact that India, which had no wagon roads when England assumed control in that country, is now noted for its fine and well-kept roads, aggregating nearly 200,000 miles in length. Give to the tropics and the orient a vehicle which will do what the horse does in the temperate-zone occident, and the plentiful supply of cheap labor in those countries will make road-building a mere incident of the development which will certainly follow.

The tropics and the orient are the great undeveloped sections of the world. Within the tropics are millions of square miles of productive land and billions of dollars' worth of products, for which the temperate zones are calling. In the orient are hundreds of millions of patient workers, and for their products the occident is increasing its demands. The inability of each of these sections to respond to our demands has been because of the absence of some available method of transportation. Given this facility, in the form of

Photo from David Fairchild, U. S. Dep't of Agriculture

A Caravan through the Desert

This picturesque means of transportation will in a few years be displaced by the auto truck and auto train

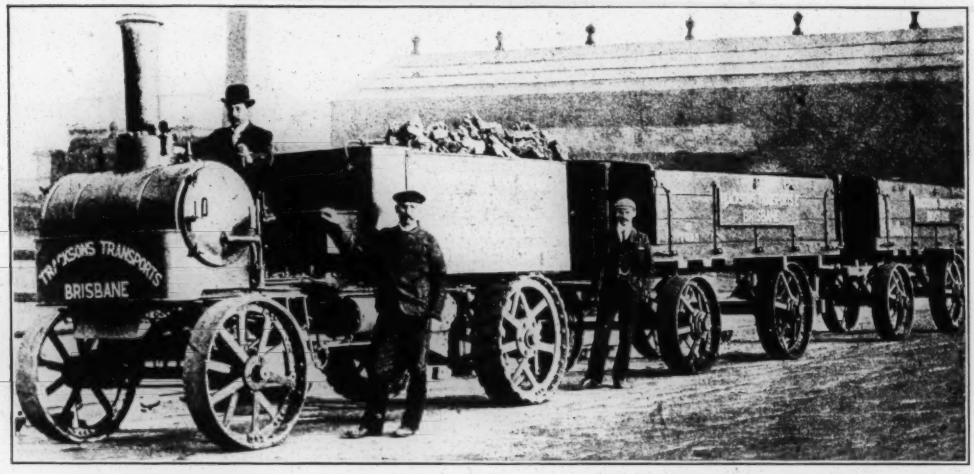


Photo from Bureau of Manufactures

An Automobile Train in Australia

the self-propelled vehicle, and with it a reasonable supply of temperate-zone energy and capital, and we shall see those countries develop, the iron horse extending his domain further and further into the interior and coming nearer and nearer to the door of every man, and with it an increased exchange of products, which will develop commerce, geographical knowledge, and general good fellowship between the people of all nations and all lands.

PLANTING FISHES IN THE OCEAN

The Marine Fish Culture Work of the United States Government

By George M. Bowers

Commissioner of Fish and Fisheries

THERE are very few countries that engage in the cultivation of marine fishes and crustaceans, and none that conducts the work on nearly so extensive a scale as does the United States. The only other country that deserves mention in this respect is Norway, which undertook the pioneer operations in marine fish culture, and has continued the cultivation of one species of fish at one hatchery up to the present time. Oysters and other mollusks are extensively cultivated in France, England, Japan, and other countries, as well as the United States, but only as a private enterprise.

The comparatively slight attention given to artificial propagation of marine fishes and other free-swimming creatures in Europe and all the other continents

except America may be explained in several ways. In the first place, government fish culture is almost unknown in most countries, and this form of agriculture is not practicable for the private fish culturist, who would not be able to reap the exclusive harvest from his labors. Then, many government fishery authorities, believing that man cannot permanently reduce the abundance of fishes by his fishing operations, however destructive, contend that he cannot appreciably increase their abundance by artificial means, however extensive. This view is far from being established by competent evidence, and is not generally entertained in the United States or elsewhere.

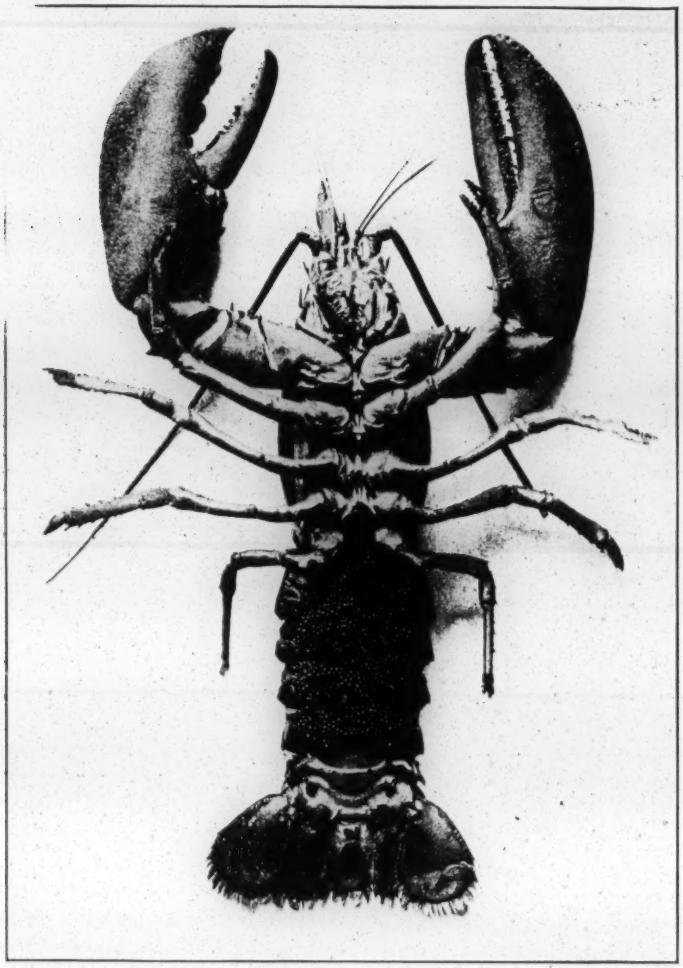
SPECIES CULTIVATED

At a very early period in the history of the National Bureau of Fisheries it was determined by Commissioner Baird and his associates that, in view of the government's lack of jurisdiction over the coastwise fisheries and its consequent inability to promote them by adequate regulation, the most feasible aid that could be rendered by the government would be through artificial propagation. The Bureau therefore took up the necessary experimentation looking to the adoption of extensive cultural operations, and soon determined the apparatus and methods applicable to the different species. The work has been conducted on a gradually increasing scale, and three government hatcheries, located at Gloucester and Woods Hole, Massachusetts, and Boothbay Harbor, Maine, are now maintained for the purpose. The fishes regularly propagated are cod at all the stations, flounders at Woods Hole and Gloucester, and pollock at the latter place. Other fishes—mackerel, tautog, sea bass, and scup—have also been hatched from time to time. Lobsters are hatched at all three stations, but the largest quantities of young are produced at the Boothbay Harbor station, recently established by Congress as a special lobster hatchery.

The great justification of marine hatching operations as conducted by the United States government lies in the fact that a vast majority of the eggs taken would be totally lost if the fish culturist did not come to the rescue. As to the few remaining eggs that might be extruded and hatched naturally, the increased efficacy of artificial propagation must be conceded.

OBTAINING THE EGGS

Cod eggs are obtained for the hatcheries in three different ways. The most prolific source is the catch of the fishermen on the Maine, New Hampshire, and Massachusetts coasts. Experienced spawn-takers board the fishing boats either on the fishing grounds or on the way to port, strip the eggs from the dying or dead fish, fertilize them, and then as soon as possible send them to the hatchery. This work, carried on in midwinter, involves great exposure and hardship, of a nature to be felt by the most stolid fisherman. The second method of securing cod eggs is to catch the mature fish with hand lines on the outlying shoals, take them to the hatchery in the wells of smacks, and hold them in live-cars pending the gradual ripening of their eggs. At regular intervals the fish are overhauled and the ripe eggs expressed and fertilized. Several thousand brood fish are thus handled at the Woods Hole station each year. An improvement on this practice has recently been tried at Woods Hole, as a result of personal observations in Norway by the Deputy Commissioner of Fisheries. The brood fish are held in a large covered compartment, and are allowed to spawn naturally; and the eggs, rising to the surface, flow over a shallow sluice and are collected in scrim bags or on a wire-mesh tray, whence they are transferred to the hatching apparatus. By this method the laborious task of forcibly expressing the eggs from the struggling fish is made unnecessary, a much larger percentage of eggs is obtained and fertilized, and the brood fish remain in excellent condition, and may be released when the spawning



Female Lobster, Showing Eggs Attached to the Swimmerets

The eggs are thus carried externally for 9 or 10 months

is completed. Pollock eggs are obtained from the boats of the market fishermen. The pollock is an excellent food fish, caught in immense quantities, and its artificial propagation is being conducted on an increasingly extensive scale.

The several hundred million eggs of the winter flounder that are now incubated each season are deposited naturally by captive fish held at the hatcheries in tanks of running water. The fish spawn at night, and practically a hundred per cent of their eggs are fertilized and hatched. Under the most favorable natural conditions a large percentage necessarily escape fertilization, many are devoured by other fishes, and many are washed ashore.

SAVING THE LOBSTER FROM EXTERMINATION

The operations of the Bureau of Fisheries in behalf of the lobster fishery are of the most beneficent character. Not-

Scraping the Eggs from a Live Lobster for Hatching Purposes

withstanding the enactment, by all the states interested, of stringent laws against the sale or possession of egg-bearing lobsters, such laws, as every one knows, have always been evaded or ignored by a large proportion of the lobster fisherman, especially in recent years, when the prices of lobsters have been high. It is an easy matter to strip the eggs from a lobster, and the fisherman who would return a lobster to the water simply because it was a "berried" female would be regarded by his associates as a crank. Seeing how the destruction of lobster eggs was going on, notwithstanding the efforts of the local fishery authorities to prevent it, the Bureau took up the matter with the states and secured a modification of the laws, by which the fishermen are now allowed openly to retain seed lobsters until agents of the Bureau take them off their hands, the fishermen receiving the ruling market price for their catch. The lobsters are first taken to the hatchery, where their eggs are gently scraped from the abdominal appendages, and are then carried offshore and released in deep water. In this way not only are millions of lobster eggs saved each year, but many thousands of mature female lobsters are given a new lease on life.

Since the establishment of the lobster hatchery on the Maine coast, egg-bearing lobsters bought during late summer and fall are held in large enclosures, or "pounds," until the following summer, and are then relieved of their eggs shortly before the time they would hatch naturally. Practically the entire New England coast is now patrolled by agents of the Bureau in quest of seed lobsters, the work being limited only by the attitude of the fishermen and the facilities and funds available.

HATCHING METHODS

The eggs of most of the marine food fishes float at the surface, and therefore require entirely different treatment from that given the heavy eggs of salmons and trouts on one hand and the semi-buoyant eggs of the shad and whitefish on the other. The incubation of immense numbers of floating eggs has been made possible by the invention of a very ingenious device known as the automatic tidal box. Such boxes, arranged in series in the compartments of a long trough, consist of wooden framework open at the top and covered with cheese cloth at the bottom. The water is supplied to each compartment by means of a tube which discharges into a little well, from which the water escapes with some force through a small aperture in the center of the back of each box; this current imparts a double rotary movement to the mass of eggs. In the front of each compartment a siphon works automatically and permits the entire renewal of

George M. Bowers, Commissioner of Fisheries

Interior of a Marine Hatchery

In the troughs, which contain the automatic tidal boxes, the eggs of the cod, flatfish, and other species are hatched

the water every 6 or 8 minutes. From 400,000 to 500,000 cod or similar eggs may be placed in one box, and these hatch with little attention from the fish culturist, owing to the complete oxygenation afforded by the circulation and frequent change of water. The young emerge in 10 or 11 days when the water temperature is 46° or 47° F., but the hatching may be deferred for 50 days in water of 31° F.

The eggs of the lobster are semi-buoyant and are susceptible to the same methods of hatching as the eggs of the shad—that is, in glass jars from which the young escape as they come from the egg and swim in the zone of water in the top of the jars. As the larval lobsters are cannibals from the moment of their emergence from the egg, it is necessary to keep them constantly stirred and to plant them as soon as possible in order to avoid wholesale mutual destruction.

EXTENT OF THE WORK

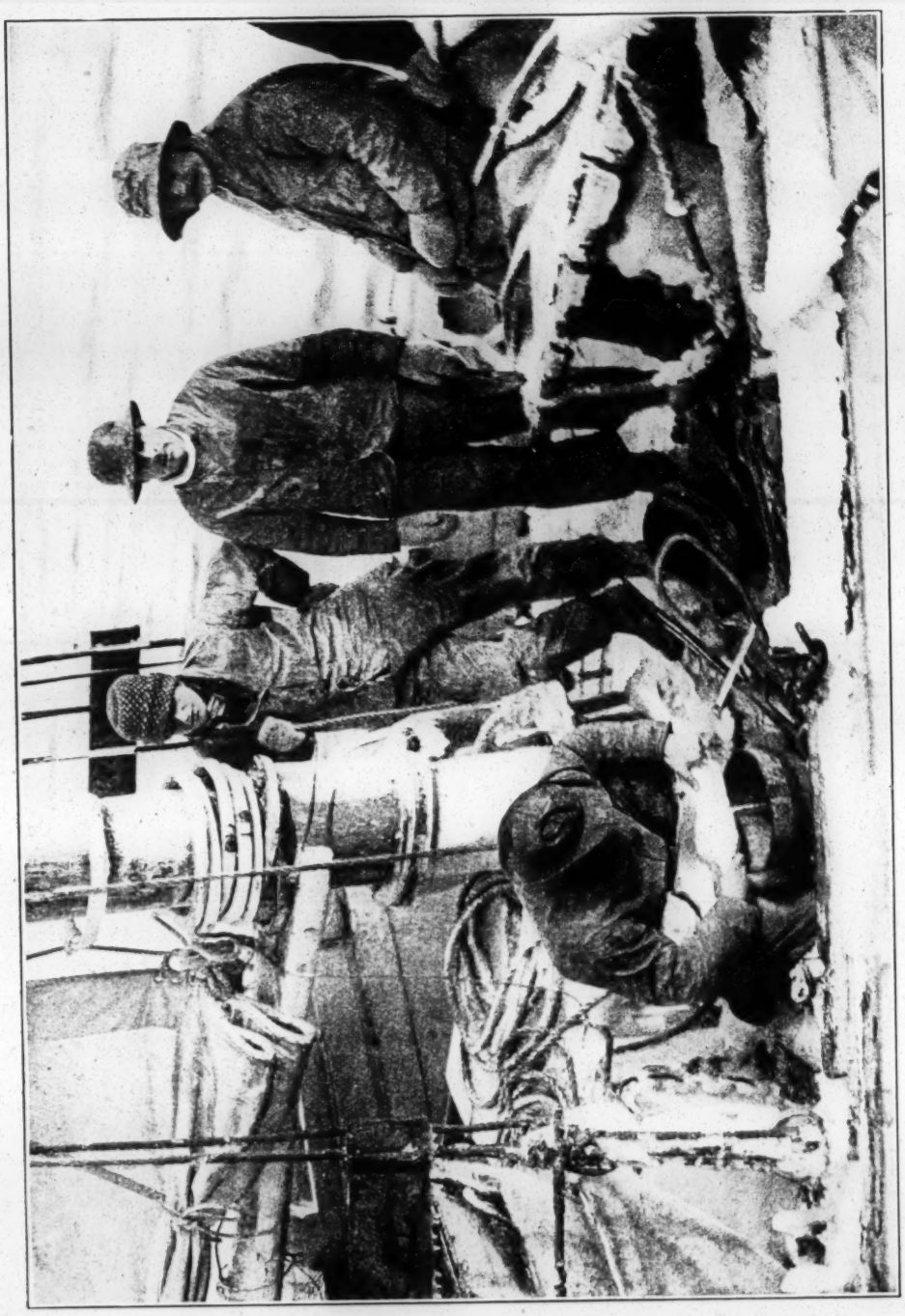
The magnitude of the fisheries to be aided and the area of the waters to be stocked have necessitated the most extensive fish-cultural operations on the part of the government. The yearly output of the hatcheries must be counted by hundreds of millions, and the efforts should be annually increased in order to offset the increased drain on the supply occasioned by the growing demand and larger numbers of fishermen engaged. Lack of facilities has up to this time prevented the rearing of lobsters and marine fishes, and tremendous destruction of the delicate newly hatched fry must thus be discounted by planting the young in far greater numbers than would otherwise be required. During the past ten years the Bureau has planted in New England waters more than 4,450,000,000 artificially hatched fish and lobsters. The output for 1907 was 654,680,000, which was much larger than for any previous year.

BENEFITS OF MARINE FISH CULTURE

The difficulty of determining the results of fish culture is greater in the case of marine operations than in any other branch. The products of the hatcheries are free to roam so widely and mingle with other fish to such an extent that it is almost impossible to separate the results of artificial propagation from those due to natural reproduction. Indeed, so little conclusive evidence can be adduced in support of marine fish culture that many persons are entirely skeptical as to its benefits.

As already stated, the Bureau of Fisheries has proceeded on the hypothesis that the effects of man's improvidence with regard to the shore-inhabiting species can be counteracted by sufficiently extensive artificial measures; and it has had ample justification for a continuance of its operations in the widespread popularity of the work and in the vast amount of unsolicited testimony received in the last twenty years showing the apparent increase in the abundance of the species handled at the hatcheries.

It was about 1889, some ten or twelve years after cod cultivation was systematically begun, that the first results began to be manifested. Schools of small fish, of marketable size, appeared on inshore grounds that either had never before had runs of cod, so far as known, or had been visited by only limited numbers of such fish. Careful observations conducted by the Bureau had traced the annual growth of the artificially hatched fry in the coastwise waters, and had left little doubt that the immense bodies of cod that had recently appeared were the direct outcome of the hatchery work. The fishermen were quick to take advantage of the new run of fish, and it was estimated that in 1889 the fishermen of southern New England had caught cod to the value of $250,000 on grounds where regular cod fishing had never before been profitable. The abundance of the so-called "hatchery cod" in the inshore bays and sounds has continued without interruption, and a definite fishery has been established. Furthermore, a most lucrative small-boat fishery has been built up on the shores of New York



Spawn-taker Obtaining Cod Eggs from a Fishing Vessel, Gloucester Harbor

and New Jersey. There has also been an increase in the numbers of small cod in the shore waters north of Cape Cod.

The downward trend of the lobster fishery had, up to a year or two ago, been apparently uninfluenced by the annual planting of large numbers of lobster fry; but there is now considerable evidence that the increasing output of the hatcheries is bearing fruit. Fishermen are reporting more under-sized lobsters than they have seen in many years, and in various places where fishing had been abandoned because it did not pay, the fishermen are now making good catches. It is difficult to understand how the annual planting of the progeny of 20,000 to 30,000 lobsters can fail to influence the available supply for the market, even if only one lobster fry in each hundred planted reaches maturity; and the Bureau has occasion to feel gratified that the decline has now been positively arrested in localities where large numbers of fry have been deposited for a series of years, and where there was absolutely no reason to look for any betterment, if nature had remained unaided.

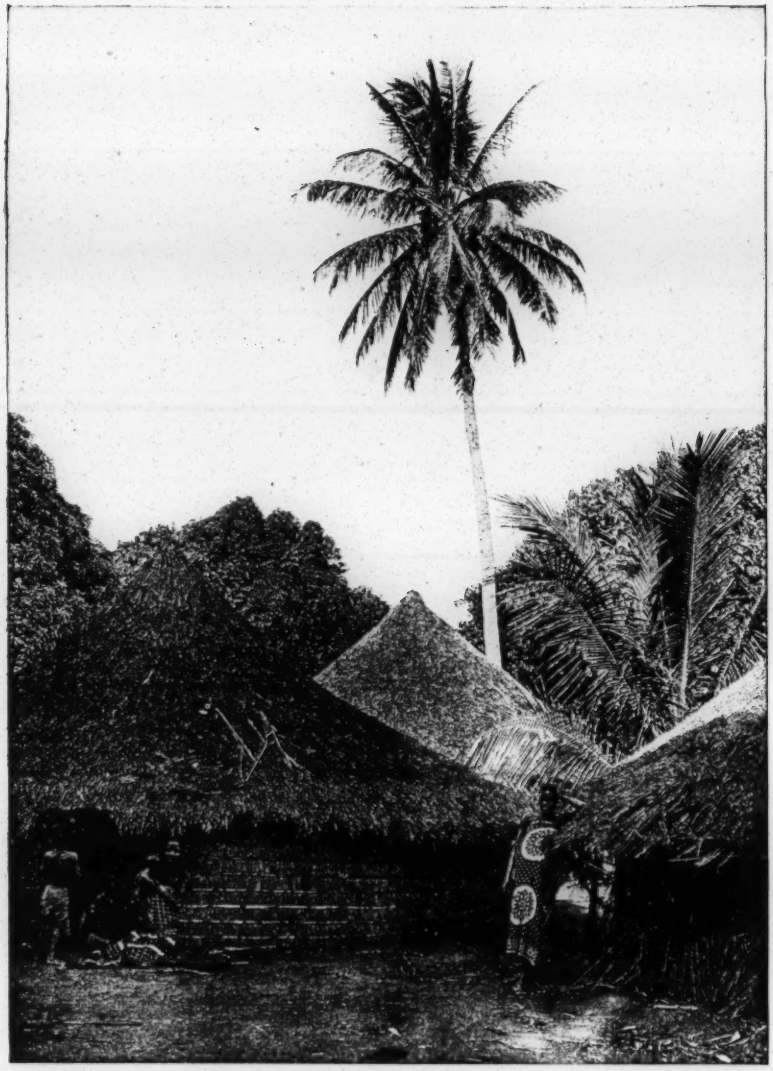
HUNTING BIG GAME IN PORTUGUESE EAST AFRICA*

THE big animals of Portuguese East Africa are admirably described in a recent work by Mr R. C. F. Maugham, who was for a number of years British consul to that country. This section of the continent abounds in game, but curious and unaccountable gaps are sometimes observable in families common to neighboring regions. For instance, no ostriches are found, although numerous in parts of the neighboring British protectorate. The crested eagle is likewise absent.

"Of pigs, we have at least two—the grotesque wart-hog, with his large, curling tushes, and a smaller red hog, probably the *Potamochœrus chœropotamus* or *P. africanus*. The former (*Phacochœrus œthiopicus*) is very numerous throughout the drier, sandier districts, and in the mountains of both Cheringoma and Gorongoza I have seen them in large numbers. Their unsightly warts, two on each cheek, are much larger in the boar than in the sow, as are also the tushes, which in the former animal sometimes grow to such a size as to end their points up to a line with the eyes. They are very fierce when cornered, and I remember on one occasion a large boar I had wounded suddenly charged down upon a gun-bearer with a perfect cyclone of shrill grunts, and would assuredly have reached and injured him had not one of his comrades, who stood by, hurled a spear with great skill; this checked the animal's onset and enabled me to plant a fatal bullet behind his shoulder. The other variety is much smaller and, with a rather vivid red collar round the neck, possesses a long, thin white mane and a curious beard-like growth of white bristles under the jaw, which turn upward as though they were sedulously brushed. The body is of dark reddish brown, and this animal is, I may add, an exceedingly welcome addition to the sportman's larder.

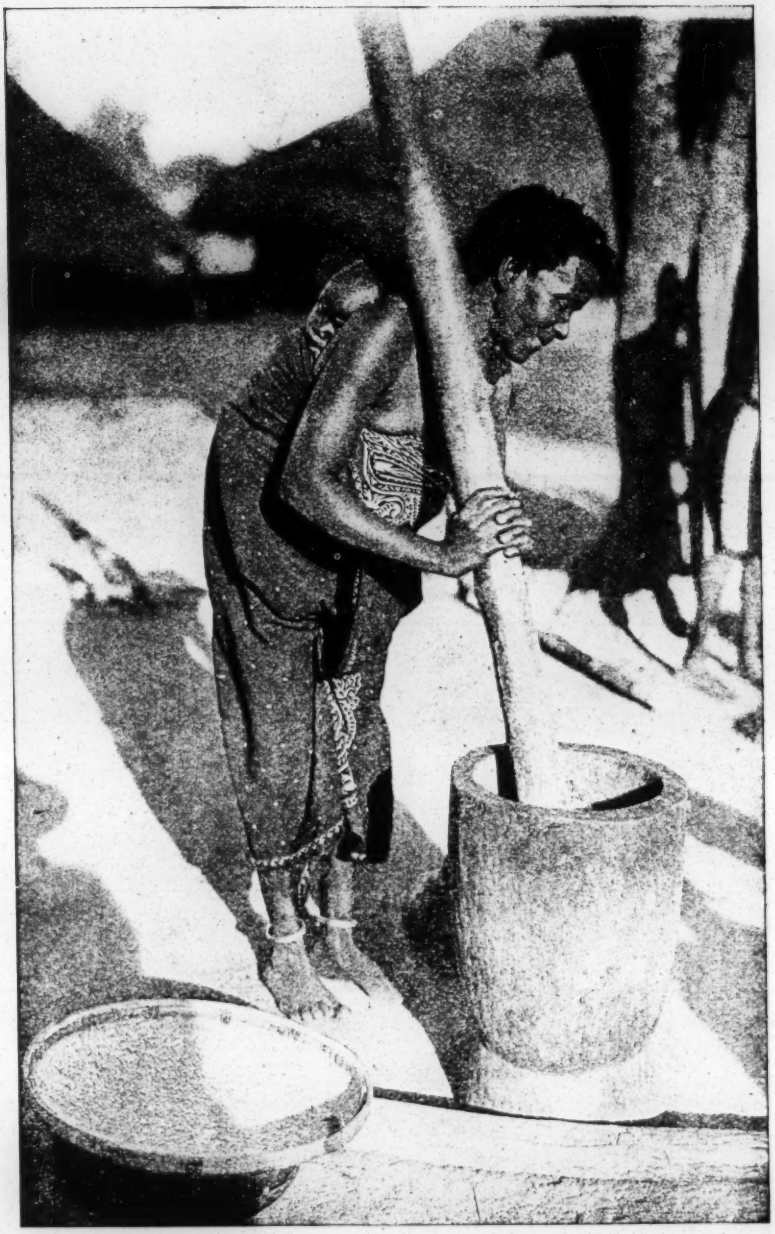
"That enormous bald, hideous offal-eater, the formidable beaked marabou (*Leptolipus*), abounds in the interior, consorting with vultures, turkey buzzards, fishing eagles, and the *profanum vulgus* of the scavengers. Nobody who has not witnessed the spectacle could imagine the astounding rapidity with which all these birds, and many more, assemble from nowhere in particular when

* Portugese East Africa: The History, Scenery, and Great Game of Manica and Sofala. By R. C. F. Maugham. With Map and illustrations. Pp. 340, 6 x 9 inches. New York: Imported by E. P. Dutton.



A Typical Native Village in Portuguese East Africa

This and the following six illustrations are from "Portuguese East Africa," by R. C. F. Maugham



Native Woman Pounding Maize

The Wart-Hog (See page 723)

The Fallen Monarch

A Fair-sized Bull Hypopotamus

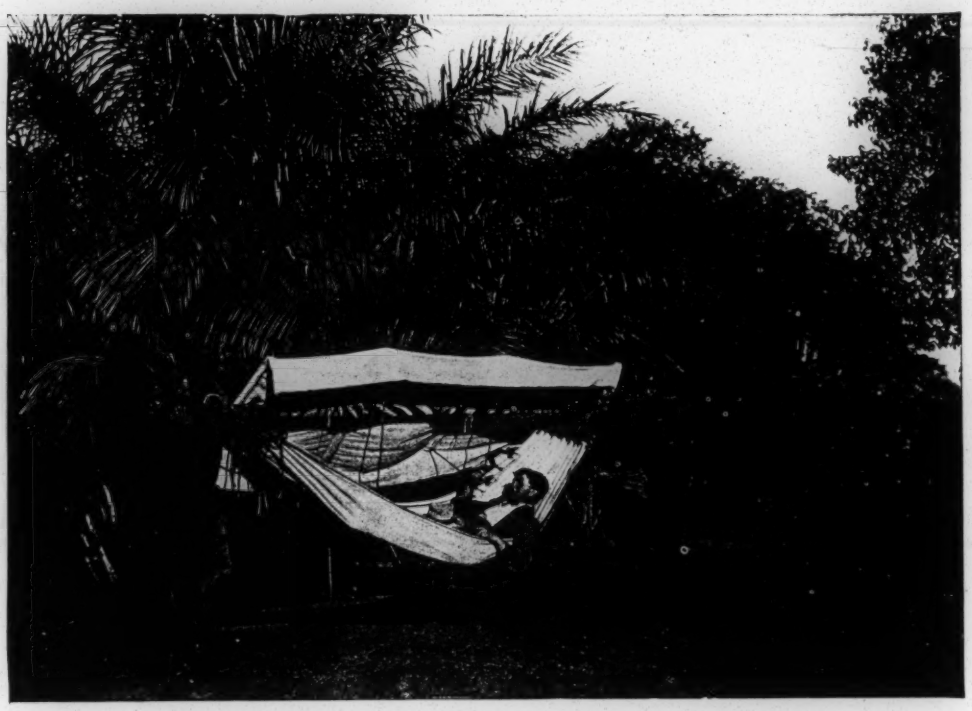
Native Drums

some large beast is being skinned and cut up on an exposed plain.

"I remember last September that, having shot a large elephant in surroundings such as I have described, I sat by while the great slabs of skin were removed from the gigantic sides, and the carriers, hastily summoned from the camp and reinforced by people from a neighboring village, proceeded to cut up the vast mountain of flesh. Almost immediately a shadow flitted across the carcass, and looking upward one became aware that the deep blue above was rapidly filling with countless black wheeling specks. The sense of sight possessed by all these birds is incredibly acute, for, during the whole period we were engaged in cutting the elephant up, they continued to congregate. The buzzards, kites, and scapulated crows boldly alighted on the grass and on a few neighboring bushes and awaited calmly the moment when we should take our leave, while overhead, at a great height, the shyer varieties, including the marabous, large bare-necked (probably *Gypohierax*) vultures, and screaming fishing eagles continued to hover.

"At length, all the meat was carefully apportioned, the tusks chopped out, and all that remained of the great elephant were some huge bones and other fragments lying in a confusion of trampled internal organs. We started for the camp, but before we had marched 20 yards every one of those waiting birds was settled upon the remains, while, with a rush like the roar of a war rocket, the greater vultures fell with wings tightly folded from a height of 300 or 400 yards to take part in the feast. The startling noise made by these heavy birds falling head foremost through the air, to check their plunge with outspread wings so close to the ground as to make destruction appear inevitable, was most singular and impressive.

"Dancing and singing are the principal



Traveling in Pre-railway Days, Portuguese East Africa

forms of native amusement, and are indulged in all over the country about the time of full moon. The music of the drums is the most general form of accompaniment, and many of the people become astonishingly expert in beating them. The number of drums used at one time is as a rule three, and this number is never allowed to exceed five or six, although on one occasion, when I was in Maravi's main town, close to Mozambique, I witnessed a dance in which over 2,000 persons took part, to music furnished by over thirty drums. On this occasion three immense rings were formed, and the drums were stationed a little way off. This was the most imposing festivity of the kind at which I have been present."

Mr Maugham gives an interesting summary of Portuguese exploration and settlements in Sofala and Mozambique. When the Portuguese came in 1502 they found the region ruled by an Arab sultan, whose vessels traded in slaves and gold and ivory along the East African coast. The region was fabled for its wealth, and, in fact, Mr Maugham believes that the wild jungle in which he hunted was "the legendary Land of Ophir" itself; "that land to which King Solomon of old sent the vessels which enriched his treasury and enhanced his influence, and to which the ancient Phœnicians sent their fast-sailing argosies, to return laden with the riches of the land of Punt."

No part of the world arouses greater curiosity or is veiled in deeper mystery than the hinterland of Portuguese East Africa and the neighboring territory of Mashonaland and Rhodesia, where the ruins of many cities surrounded by walls of solid masonry have been found, but not a single inscription to tell of their inhabitants or age.

A VISIT TO LONELY ICELAND

By Perley H. Noyes
Member of the National Geographic Society

ABOUT the year 860 A. D. a Norwegian pirate named Naddodd, who had been forced to settle in the Faroe Islands on his return from an expedition against Norway, was driven by a storm far out of his course and sighted land considerably to the north, which, from the amount of snow on its mountains, he called Snaeland, or the Land of Snow. Four years later one Gardar Svafarson, a Swede, being similarly driven northward against his inclination, sighted this same land, which he circumnavigated and discovered to be an island. On that account he called it Gardarsholm, or Gardar's Island, and, having spent a winter on its northern shore, at the site of the present little town of Husavik, he returned in the spring to Norway.

Gardar gave so favorable a report of the new country that the adventurous spirit of another Norwegian pirate, Floki, prompted him to go in search of it himself, with the idea of taking possession of it. He proceeded, accordingly, first to the Shetlands, and then to the Faroes, whence he sailed northward on his journey. The compass not then being known, Floki resorted to a novel method of apprising himself of the proximity of land. He took with him three ravens, consecrated to the gods, to guide him on his way. The first of the birds he let loose after having lost sight of the Faroes, and it took its flight back thither; the second, which he loosed later, rose to a great height in the air, and, after hovering about for some time, returned to the ship; the third directed its course northward, and Floki shortly afterwards landed on the island which he sought.

He appears to have spent too much of his time in fishing, neglecting the hay harvest, in consequence of which all the cattle he had brought with him died during the winter. Greatly vexed at this loss, Floki determined to seek a more favorable climate, but before leaving the island he chanced to notice from the top of a mountain near the coast that one of the bays was completely filled with ice, and because of this he renamed the island Iceland, and this name it has ever since retained. In 870 Iceland was again visited by Norwegians, Hiorlief

An Icelander Knitting Socks

and Ingolf, and being well impressed with the country, after a winter's residence there, they returned to Norway to fit out an expedition which should make a permanent settlement on the island. This they did in 874, and the Icelanders date the occupation of their country from that year.

So much for the discovery of the islands and its first settlement. Whether or not natives of Ireland had lived in Iceland previous to its discovery by Noddodd seems to be a disputed question. At any rate, the evidence relied upon in support of the supposition is very meager.

The early colonization of Iceland was greatly promoted by the tyrannical rule of Harold the Fair-haired in Norway. His relentless oppression drove from that country many of the petty kings, who preferred independence in a strange and unknown land to persecution and humiliation at home. These nobles took to themselves considerable districts in Iceland, and for nearly 400 years governed the island with no interference from the outside world. Internal feuds, however, had been going on over a good part of this period, and at last, in 1261, Hacon, the king of Norway, succeeded in effecting the subjugation of Iceland to Norway. In 1387 it passed to Denmark and is today one of her colonies.

NOT A BITTERLY COLD COUNTRY

Many misconceptions as to Iceland exist in our country. It is, perhaps, generally thought of as a cold and snowy land, inaccessible except after much inconvenience and possible hardship. It may seem surprising to many to know that the Icelanders who have emigrated to America are said by their relatives at home to complain bitterly of the extreme cold of our winters. Mr Halldor Bjarnarson, a Lutheran minister, residing at Prestholar, a parsonage on the north coast of Iceland, writes me of the past winter in his district, that at no time did he observe the temperature to drop below +5° Fahrenheit, and that in the north of Iceland, almost on the Arctic Circle.

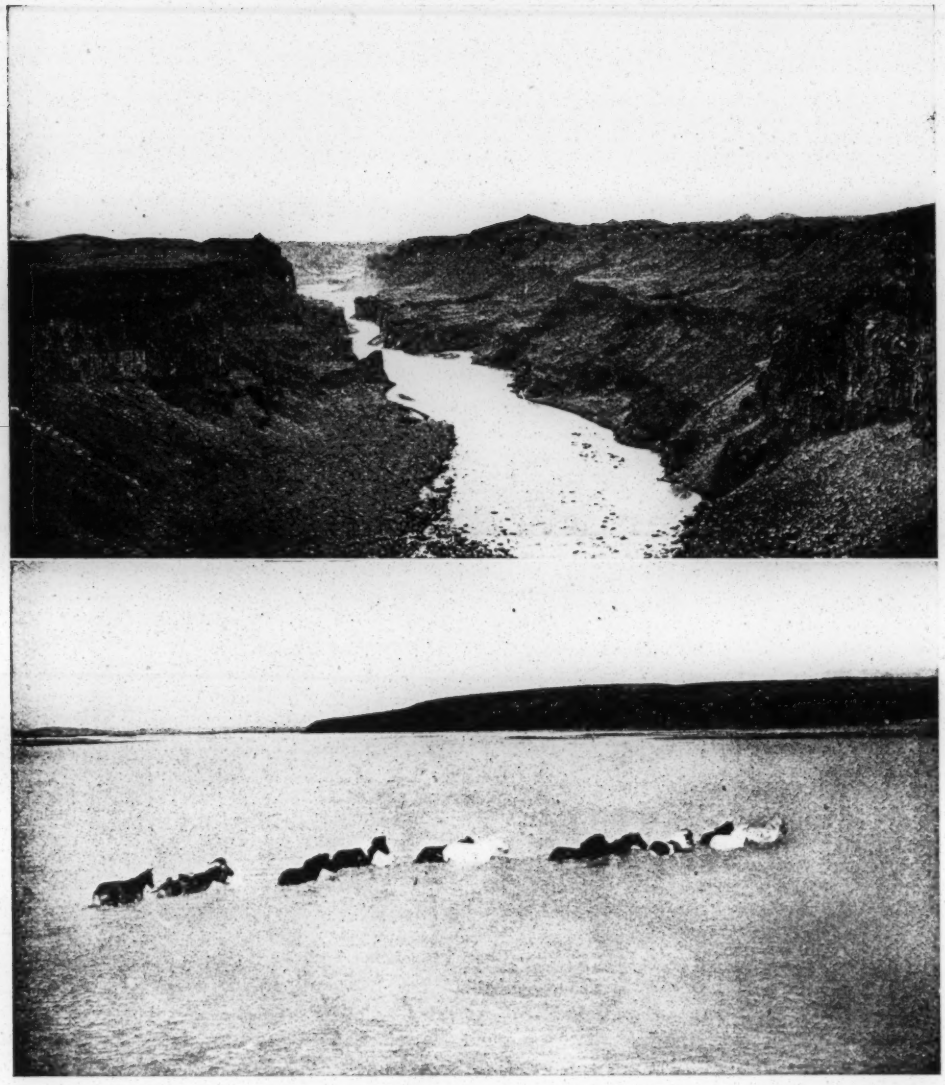
Two lines of steamships maintain regular all-the-year sailings between Denmark, Scotland, and Iceland by way of the Faroe Islands. The single passage to Reykjavik, the capital of the island, on the southwest coast, requires from three to four days from Leith, or five to seven days from Copenhagen, and the steamers of these lines are annually carrying more and more tourists to an island which is but just becoming recognized as one of the most interesting and fascinating lands in the world. The trip is usually taken from Leith, as this avoids the extra two days required in the passage across the North Sea from Copenhagen, a passage often rough and disagreeable, in a steamer of the size of those employed in the Iceland trade, which average, perhaps, 1,000 tons gross. Excluding meals, which cost one dollar a day, the round-trip fare between either Copenhagen or Leith and Iceland is about thirty dollars—certainly moderate in view of the distance covered. I have thought it best to include these items as to the time required and the cost of the trip to Iceland because of the inconvenience of ascertaining them.

Most of the steamers go direct to Reykjavik, some of them stopping at the Faroes on the northward voyage and others on the southward voyage. Some, however, proceed up the east coast of Iceland, thence westward along the north coast, and south to Reykjavik, and thence back to Leith, while others make the trip in the reverse order.

UNCHANGING THROUGH THE CENTURIES

So far I have said nothing as to travel on the island itself. The method employed is unique and primitive. Barring the possibility of driving on a narrow carriage road for about one day's ride from the capital, and possibly a less distance from some of the smaller towns, all travel must be made on pony-back. Much has been written about the Icelandic pony. He is individual, a type by himself, and the word "sturdy" is his best description. Those who contemplate long journeys on the island must be provided with two riding ponies, in addition to one or more pack ponies apiece, depending on the needs of the party. With such an outfit, 50 miles a day is easily possible.

The Iceland of today is little different from the Iceland of over one hundred



Great Canyon of the Jokulsa

Ponies Fording the Thjorsa

years ago. The same occupations, the same pleasures, the same dangers, make up the life of a simple, sincere, and hospitable people. In a country so isolated from the world, equally apart from its commercialism and its politics, there has indeed been little chance for change. The traveler who visits this country, especially those parts of it which lie remote from its semi-Danish capital, cannot but find refreshing the unsuspicious and open-hearted candor of its inhabitants. Those who travel across the island have the better opportunity of observing this, for every man's house is open to the traveler at whatever point he may choose to stop.

The Gullfoss or Gold Fall

Indeed, this custom is a necessity, for there are no towns in the interior, but only solitary farm-houses—often parsonages—each boasting its own name, and unless the traveler prefers to sleep in a tent, which he must then carry with him, there is no other shelter available.

The chief drawback to a summer's excursion to this lonely island is the frequency of rain at that season; but if this be borne in mind and provision made in advance to meet it, the charm of the great natural wonders of the country and the interest, which cannot but be aroused, in its people and their history so completely offset the discomforts of travel as to make them at best one's second thoughts.

The trip most generally taken by travelers in Iceland is made from Reykjavik and includes a visit to Thingvellir, Geysir, and Mount Hekla. Thingvellir is a wild and picturesque tract of land and water lying at a level lower than that of the country round about it. That the subsidence of this district occurred during some violent volcanic agitation of prehistoric time is unquestionable; it is conclusively proved by corresponding stratification on the faces of the cliffs of the perpendicular walls on either side of the sunken district and on the walls of the sunken tract itself. Thingvellir is the dominating point in the annals of Iceland. For nearly 900 years the Althing, or general assembly of the people, met on this spot, and the public affairs of the country were here discussed and justice administered. It was here also, in the year 1000, that after a fierce debate it was decreed that Iceland should renounce the pagan for the Christian faith. In 1800 the Althing was removed to Reykjavik.

After Thingvellir it is customary to visit Geysir, where is located the most famous group of the boiling and spouting springs of Iceland, from one of which, the largest on the island, the place derives its name. The height of the column of water thrown up by this fountain when in eruption has been variously measured and conjectured; it has a known record of considerably over 100 feet, but perhaps its average today would not be much in excess of 60 feet.

A Group of Icelandic Farmers and Ponies

An Icelandic Dog and Puppy

A Schoolboy

Drying Codfish

THE FAMOUS FALLS

Near Geysir, at a riding distance of about an hour and a half or two hours, is situated, on the Hvita, or White River, the Gullfoss—Gold Fall. The Gullfoss descends in two immense cataracts which together are said to more than equal the height of Niagara. The Hvita takes its rise in Hvitarvatn, a lake fed by the melting ice of the Lang Jokull, a large glacier lying from 20 to 25 miles north of the Gullfoss. The waters of the Hvita, like those of all the other glacier rivers of Iceland, are of a dull, yellow color, very swift and cold. As they leap over the immense precipices of the Gullfoss and boil and foam in the narrow gorge below, such an impression of grandeur and majesty is aroused as would be well nigh impossible to awaken elsewhere. Both in volume and in picturesqueness the Gullfoss far surpasses its only Icelandic rival, the Dettifoss, in the north.

After visiting Geysir and the Gullfoss, the majority of tourists, who have but a short time at their disposal, proceed in a southeasterly direction, across the Hvita and the Thjorsa to Hekla, the most famous, although not the largest, volcano in Iceland. As I did not visit Hekla personally, I cannot speak authoritatively as to the difficulties of its ascent. It is said, however, to be a reasonably easy climb, but an entire day is required and an early start is imperative.

The trip from Reykjavik to Hekla, as I have described it above, should take not less than six or seven days. The return trip may be made by a more southerly route, on which the hot springs, boiling mud cauldrons, and sulphur beds of Krisuvik may be examined. This return journey will extend the time required to a total of eleven or twelve days.

THE INTERIOR OF THE ISLAND IS DESERT AND BARREN

The interior of Iceland is a vast desert of rubble and sand, broken up by mountains and glaciers, and almost utterly devoid of vegetation. Across one of the routes of this desert, the Sprengisandr, or "Bursting Sands," our party journeyed to the north coast of the island. The Sprengisandr has been little described, for but few choose to cross Iceland by this inhospitable route. It is seldom used, even by the Icelanders themselves, almost all preferring to lengthen the journey by taking the more accessible and less dangerous coast routes. A guide thoroughly familiar with the Sprengisandr and its environment is absolutely essential, for the long ford of the Thjorsa, which the party must cross before reaching the desert proper, is difficult to locate, and, once across the river, the dangers of losing the way and of becoming entangled in the quicksands from which this route derives its name are not merely nominal.

In order to convey an accurate idea of the barrenness of the interior of Iceland, even at the risk of digressing, I cannot do better than quote from Mr W. G. Lock's "Guide to Iceland," published in 1882, but even today the best and most painstaking handbook of the island. He says (page 38): "Broadly speaking, only the fertile tracts and valleys of the coastal regions are inhabited, the interior being mainly a barren elevated plateau, studded with ice-clad mountains and slumbering volcanoes; and it is believed there are not half a dozen houses in the whole island distant in a beeline forty miles from salt water." To appreciate the full significance of this quotation it must be understood that Iceland contains 38,000 square miles, over 5,000 square miles more than Ireland.

To return again to the Sprengisandr. Properly speaking, the Sprengisandr itself requires but one day to cross, but from the time one leaves the last farmhouse in the south until the first habitation is reached in the north, no less than four days are required; during this time we did not see one human being besides the members of our own party. The chief reason which operates to make the Sprengisandr and its approaches im-

Milking Time

practicable as a traveling route is the extreme scarcity of grass for the ponies. The desert itself offers absolutely none, and even after this part of the route is covered the forage is very meager. In consequence, our ponies were obliged at one time to go for over twenty-four hours without food of any kind.

If the term scenery may be used of the region of the Sprengisandr, that which presents itself during the time necessary to reach the first fertile land in the north is monotonous beyond expression. The vast undulating plains of the desert, broken here and there by small hills of the same sand and volcanic ash, offer no other obstruction to the eye than slender wooden stakes, ten or twelve feet in height, placed at intervals of perhaps 400 or 500 feet for the guidance of the winter wayfarer who may elect to expose himself and his pony to the inclemency of this route at a season when it is covered to a considerable depth with snow. Where the desert joins its rocky and mountainous approach on the north, these stakes give place to high rock cairns, standing like sentinels on every elevation of a forbidden and hostile region.

The Sprengisandr lies between two immense glaciers, one of which, the Vatna Jokull, or Great Glacier, is said to be the largest in all Europe. Because of its situation, the desert is continually exposed to the fierce winds and snows which sweep across these ice-fields. For over half the day, in August, on which our party crossed the desert, we rode in the face of a driving snow-storm, which, although it had abated somewhat by nightfall, did not wholly cease until nine o'clock of the following morning. The cold was intense, and with our comparatively light sleeping equipment the night was spent very uncomfortably.

After reaching the first farm-house, Myri, in the north, one day's ride brought us to Akurevri, which is the second town in point of size on the island. Here our party separated, the majority returning to Reykjavik by the western-coast route, while two of us, with one guide and a complement of nine ponies, went eastward.

The Town of Seydisfjord, at the Head of the Fjord of the Same Name

ACRES OF BURNING SULPHUR BEDS

The north of Iceland is not nearly so often visited by tourists as the southern portion, and yet, to me, it was far more interesting than the more traveled south. Two days to the east of Akureyri lies an immense tract of devasted territory, to which has been given the singularly appropriate name "The fire focus of the north." The activity of this region is now undoubtedly past, but the mind could not picture a scene of greater desolation and waste, while acres of burning sulphur beds, with small geysers and boiling mud cauldrons, still exist in evidence of the dying fires beneath. Here we employed three days in visiting the extinct volcanoes and other points of interest in the neighborhood, proceeding north to Husavik, on the coast, and thence eastward again to the Jokulsa, a large river fed from the Vatna Jokull in the south.

The Jokulsa, in its course to the Arctic Ocean, has cut a deep and picturesque canyon, through which pours a volume of water in amount second only to that of the Thjorsa. Near the banks of this stream in the north is situated the famous V-shaped valley of Asbyrgi, supposed to have been caused by the subsidence of the roofs of two subterranean lava channels at and near their confluence.

Before going northward to Rifstangi, the most northerly point of Iceland, just over the Arctic Circle, we visited the Dettifoss, a tremendous cataract of the Jokulsa, and a group of craters and masses of igneous rock, to which has been given the unpronounceable appellation of the Hljothaklettar.

It was on our way to Rifstangi that chance took us to the church-farm of Prestholar. Here we met the minister of the district, Mr Halldor Bjarnarson, whom I have mentioned before, and his

An Icelander's Family

A Farm-house and Farm-yard

brother, Mr Paul Bjarnarson, and nothing can better illustrate the hospitality and courtesy of the Icelanders than the fact that these gentlemen took voluntarily three days of their time to accompany us over a section of their island with which our guide was unfamiliar. At Prestholar we saw the message found in the drift-cask set loose by the Geographical Society of Philadelphia, the probable drift of which was outlined in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1906. The cask had been picked up by a farmer living near Prestholar, and being unable to read the message it contained, although it was printed in four languages, he had taken it to the Messrs Bjarnarson, by whom it was forwarded to Philadelphia.

Our principal concern in going to Rifstangi was to reach by land the most northerly point in Iceland, and, if the memory of the immediate inhabitants of this district may be relied upon as accurate, no foreigners had ever before reached the spot in this way. There is nothing particularly difficult about this part of the trip, except that the road, if it may be called a road at all, for the last few hours of the ride leads over an unbroken mass of boulders and round stones, among which any other horse than a native pony would inevitably break his leg.

From Rifstangi to Seydisfjord, whence we left for Scotland, the trip was comparatively uneventful. The east coast of Iceland is exceedingly mountainous, and each day succeeded the preceding in substantially the same way—*i. e.*, we would ascend some mountain in the morning, travel across a high plateau for the greater part of the day, and descend to some farm or coast town in a valley or fjord for the night. The descent to Seydisfjord was particularly beautiful. After winding in and out among great ridges of rock, the road bends abruptly and the little town at the head of the fjord comes suddenly into view far below, each little white-painted house a mere speck in the distance. From this point it is nearly two hours' ride to the town itself.

The trip which I have detailed above occupied approximately four weeks. During that time we had abundant opportunity for observing the character and disposition of the simple people to whom Iceland is "home." Even should the marvelous scenery of the island fail to awaken the visitor's enthusiasm, he cannot leave its shores without admiration for the loyalty and devotion of its inhabitants to a land so unfavored both by nature and geographical position.

THE LAND OF FIRE*

BY HERR JON STEFANSSON, PH. D.

GEOGRAPHICALLY and geologically Iceland is part of—a continuation of—the British Isles, for it is situated on the same submarine mountain ridge, stretching from southeast to northwest across the North Atlantic, the average depth on it being 1,500 feet to 2,000 feet, while north and south of it 12,000 feet is the average depth, reached by sounding. According to Prof. James Geikie, land connection between Greenland and the British Isles must have existed in Cenozoic times, for relics of the same Tertiary flora are found in Scotland, the Faroes, Iceland, and Greenland.

It is as rational to call this island Iceland as it is to call an ice-sheet meas-

*Abstracted from "Iceland; its History and Inhabitants." By John Stefansson. Smithsonian Institution, 1907.

uring several hundred thousand square miles Greenland. Iceland is not a bleak, arctic region, embedded in thick-ribbed ice, though its northernmost peninsula, Rifstangi, projects a mile north of the Arctic Circle. Though situated between 63° 24′ and 66° 33′ north latitude, its thermic anomaly is such, owing to the Gulf Stream, that the mean temperature of the month of January on the west coast of Iceland is 34.5° F. higher than it should be in that latitude. It is surprising that January at Reykjavik is milder by 1½° than at Milan, north Italy, or 1° F. milder than at Munich, which is 3½° farther south than London.

Grimsey, off north Iceland, cut in two halves by the Arctic Circle, is 5° F. warmer in January than Stockholm. The coolness of the summer, however, owing to the nearness of polar ice drifting down from Greenland, reduces the annual mean. It will thus be seen that Iceland has a temperate climate, while the clearness of its atmosphere rivals that of Italy. It is freer from microbes than the air of any part of Europe, and, according to the researches of Dr W. L. Brown, the blood of the Icelander on an average contains more hemoglobin than that of other inhabitants of Europe.

No country on earth of equal size contains so varied and wonderful phenomena. The glaciers of Switzerland; the fjords, salmon rivers, and midnight sun of Norway; the volcanoes, grottoes, and solfataras of Italy, on a grander scale; the mineral springs of Germany; the geysers of New Zealand; the largest waterfall, next to Niagara, in the world—all are here. Nowhere has nature been so spendthrift in giving a geological lesson to man. If there be sermons in stones, volumes lie unread here. Here we see her Titanic forces at work building up a country. Nowhere is it possible to study so well the geological conditions prevailing toward the close of the Glacial Epoch in Europe.

Iceland is the center of a suboceanic volcanic region, and no region of the earth has an equal title to be called the "Land of Fire." It owes its very existence to volcanic agency continued today, and may be truly called the abode of subterraneous heat. No spot on the surface of the globe of its extent exhibits marks of fire in such a multitude, in such a variety, and of such a magnitude. None contains an equal number of volcanoes. Nowhere have eruptions of such magnitude occurred. Dr Thoroddsen has counted 107 volcanoes, 83 of which are a series of low craters or crater chains, 8 are of the Vesuvius shape, and 16 of the Sandwich Islands lava-cone shape. Five thousand square miles of land are covered with lava. The post-Glacial lava alone would cover Denmark with a layer 16 feet in thickness. The largest lava desert is the Odaoahraun, which covers an area of 1,700 square miles and is from 1,600 to 3,500 feet above sea-level. This lava field has been formed by the eruptions of about 20 volcanoes. The cubic capacity of the lava ejected here would make a solid cube, each side of which would measure about 50 miles. The most frequent form of manifestation of volcanic eruption is the formation of a series of low craters, ofter several miles in length, along lines of cleavage in the crust of the earth. The longest is that of Laki, 20 miles long, containing about 100 craters.

Sometimes lava has welled up out of fissures without craters. The largest of these is Elvgja, north of Myrdalsjokull, 19 miles long, 434 feet deep—in one place, 656 feet deep—the bottom being 468 feet wide. The volcanoes are not, as was formerly supposed, limited to the regions of palagonite breccia. On the Faxa Bay are many small volcanoes which have broken through the basalt. About 25 volcanoes have been active in historic times (900-1900). Vesuvius is dwarfed into insignificance, for the lava flood of the last eruption in Iceland, in 1875, has been computed to contain 31,000 millions of cubic feet, while in the largest eruption of Vesuvius on record, that in 1794, only about 7,000 millions of cubic feet of lava were ejected.

Iceland has another and greater claim to one's interest. It is, as William Morris said, "the Greece of the North." It produced in the twelfth and thirteenth centuries a literature unparalleled after Rome before the golden age of England and France, in character drawing, in passionate dramatic power, in severe, noble simplicity, in grim humor. All the characters of the Sagas live and move today. Every hill and headland and valley in the island is full of their presence. The Icelander of today knows them by heart. It is as if every Englishman, from pauper to king, knew Shakespeare's historical plays and could retell them more or less in his or her own words. It has kept the national times alive through evil times. It has preserved the language almost untouched by time and foreign intercourse.

Nowhere is the contrast between man and his surroundings so glaring as in Iceland. Buried in snow and darkness, deprived of every comfort, living on rancid butter and dried fish, drinking sour whey and milk, dressed like his servants, seeking in a little boat his food, yet a cultured mind, possessing an intimate knowledge not only of the history of his own country, but of Greece and Rome; a poet fond of throwing off satires, intellectually and morally the equal of his European guest, considering himself your equal and refusing to be ordered about by a rich Englishman, owner of several square miles of land and hundreds of sheep, with a pedigree going farther back than that of his visitor; a jack-of-all-trades, a blacksmith in his smithy, boat-builder and carpenter, an artist in filigree work, a carver in wood, an eager reader in books, he has universal education up to the degree to which it is useful for a man.

There are no schools in Iceland, yet every child at 12 can read, according to the parish statistics. In no country in Europe are so many books printed and sold, in proportion to the population. A population of only 76,000, scattered in many hamlets, has 12 printing presses, the earliest being established as far back as 1530; about 100 books annually, 14 newspapers, and 8 periodicals are produced to satisfy the literary needs of this little nation.

Yet this literary people still live in a pastoral and Homeric civilization, which is a modern lesson of the healthfulness of human life lived in close contact with the free, wild life of nature, such as would have delighted the heart of Rousseau or Thoreau. As a proof that this life is healthy, I give the example of a clergyman who died four years ago 113 years old, having managed to live all his days healthy and happy on £30 ($150) a year, the average stipend in the Icelandic church.

The sheep yield food and clothing. Their wool is pulled off in spring, carded, spun, woven in hand looms, and worn undyed. You make shoes of their skin and spoons of the horns. Every opportunity is seized for the telling of stories and reciting of poems. Only the milk ewes are kept at home in the summer to be milked; the rest of the sheep are gathered in from the mountains in autumn, notice being given at church from the pulpit.

The autumn gatherings, with people sitting on the walls of the stone inclosure telling stories, are quite Homeric. The winter evenings are spent with each member of the family busy at work in the same room; the men on their knees shaving the wool off sheepskins, making ropes and nets of hair; the women using spindle and distaff, embroidering, etc., afford a still better opportunity for stories and puns.

There are even wandering minstrels who gain their livelihood by reciting prose or poetry, which they know by heart, at various farm-houses, till they exhaust their stock.

To conclude with a few statistics: The annual trade of Iceland is worth close on £1,000,000 ($5,000,000), export and import together. The principal articles of export are salted codfish, wool, mutton, and eider down. A large increasing

part of the trade is with Great Britain. In the fifteenth century all the foreign trade was in English hands. Henry VIII negotiated with Denmark in 1518 and 1535 for its transfer to England, and its economic and strategic importance to Great Britain has been set forth as late as 1835 in the Quarterly Review by Sir George Mackenzie and Sir William Hooker, who held that Iceland ought to be a British possession. It has been declared by experts that the fishing-grounds of Iceland are richer than those of Newfoundland, and, though they are much nearer Great Britain, their annual yield is not more than £2,000,000 ($10,000,000), because they are not worked as they ought to be.

For four hundred years Iceland was an aristocratic republic, ruled by the great families of the early settlers, among whom was a Norse queen of Dublin. A fourteen days' open-air parliament of all Iceland met annually in June at Thingvellir, and the speaker of the law (lög-söguman) used to recite from memory the whole of the unwritten, elaborate laws of the country to the assembly. In 1262-1264 Iceland was united to Norway, and in 1380 with Norway to Denmark. The Danish rule ruined the island economically, but since the granting of self-government and the reëstablishment of the old parliament, in 1874, at Reykjavik, great progress has been made. The revenue of Iceland is now six times as large as 28 years ago, and it is probably the only country with no debt, but with 1,000,000 crowns of savings in its exchequer; yet more has been expended on the ways and roads of the island since 1874 than in all the previous centuries.

The Icelanders are keen politicians; women have been in possession of the municipal vote earlier in Iceland than in any other country, and they do not change their names when they marry. The parliament (althing) is composed of an upper house of 12 members and a lower house of 24.

SCENES FROM EVERY LAND

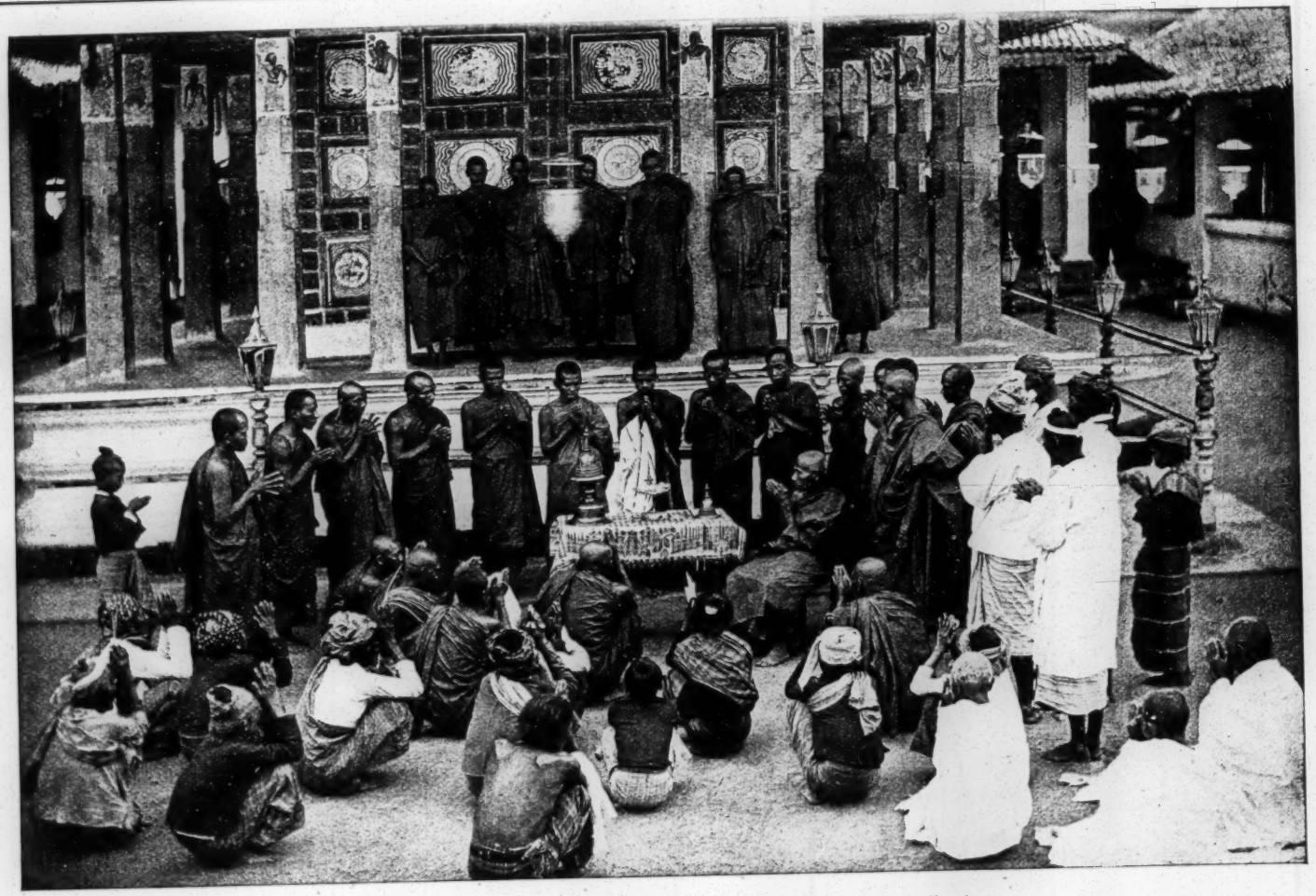
Copies of "Scenes from Every Land," by Gilbert H. Grosvenor, are now being forwarded to members of the National Geographic Society who have ordered this volume. Owing to the popularity of the suggestion, it was necessary to print a larger edition than had been planned, and therefore the publication has been delayed several weeks.

The volume contains more than 250 illustrations from the Magazine, with 50 to 200 words of description under each picture; a list of nearly 1,000 books of travel, exploration, and general geography, as well as a small map in five colors. Three-fourths of the edition have already been disposed of. The remaining copies will be reserved for members of the National Geographic Society and readers of its Magazine until December 15, after which the balance will be obtainable by the public.

PHOTOGRAPHIC COLLECTIONS

Mr Herbert L. Bridgman, of Brooklyn, has sent to the library of the National Geographic Society a series of fifty photographs of scenes in Khartoum and Egyptian Sudan, taken or purchased by him on a recent visit to that region. Mrs J. Howard Gore, of Washington, has presented to the Society a series of Swedish pictures illustrating the costumes and manner of life of the Swedish peasants.

It is hoped that members of the Society who have an opportunity of taking or collecting photographs during their travels will send them to the library of the Society. If members do not care to part permanently with their pictures, but wish to place them where they will be safe from fire and be taken care of, it is suggested they send them also to the Society. Such pictures will be returned whenever the member desires, and will not be published without the consent of the owner.



A Special Exhibition of the Sacred Tooth, Kandy, Ceylon

The Sacred Tooth (of Buddha) was brought to Ceylon from India by a princess and enshrined in a palace of its own. It was carried off as loot by one of the Malabar raiders of Ceylon ten centuries later, recaptured and returned to Ceylon, and treasured in a hidden shrine until 1560, when the Portuguese took it and carried it to India, where they burned it with great pomp and threw the ashes into the sea. The King of Kandy thereupon had a new tooth, 3 inches long, made of choicest ivory and enshrined in the place of the lost one. Photo from Miss Eliza R. Scidmore in "Scenes from Every Land."

HELPING THE FARMERS

NO government in the world spends so much for the development of its farms and farming interests as does that of the United States. Many millions of dollars are annually appropriated by the U. S. Congress and our state legislatures for practical experiments and researches to increase the profit of our farmers by creating or finding new and better products for them to grow or to protect or improve the soil of their farms. As a result, much greater progress in practical agricultural science and methods have been and are being made in the United States than in any other country.

One of the most interesting and impressive annual volumes of the national government is the yearly Report of the Office of Experiment Stations of the U. S. Department of Agriculture, which summarizes the work in progress at the many state experiment stations. The list of investigations at the Wisconsin station, at Madison, as given in the last report, is typical of the others. Here they have discovered improved methods in cheese-making which will mean an increased annual profit of $150,000 in this industry to Wisconsin alone. They have also found that by spraying with iron sulphate solution it is possible to destroy wild mustard, oxeye daisy, cockle burs, and ragweed in oat fields without injury to the oat crop. The strength used has been about 100 pounds of iron sulphate to 50 gallons of water per acre, and the cost of material from 60 to 75 cents per acre—much less than for a copper sulphate solution. The pictures on pages 474-749 illustrate other lines of work at this station.

One of the most important efforts of the national and state governments is to encourage the study of agriculture in the schools and colleges and to help the Farmers' Institutes. These institutes are now organized in all of the states and in all of the territories excepting Alaska. The number of institutes held in 1906 was 3,409, and the number of sessions 11,409. The attendance at these institutes was 1,299,172, an increase of 403,980 over the attendance of the previous year. The average number at each session was 114. The appropriations for the institute purposes amounted to $269,672. Fifteen states reported round-up meetings, with an attendance of 24,598; 19 states held special institutes, attended by 85,762; 13 states reporting upon agricultural trains give an approximate attendance upon these trains of 215,890. The aggregate attendance for the year, including the regular institutes, the round-up meetings, special institutes, and railroad specials, was 1,625,422. The number of institute lecturers increased from 995 in 1905 to 1,225 in 1906.

NATIONAL GEOGRAPHIC SOCIETY

Members changing their addresses should notify the Society at the earliest moment in order that the Magazine for the current month may be correctly forwarded. When this is not done duplicates very often cannot be supplied, as the edition of the Magazine may become exhausted.

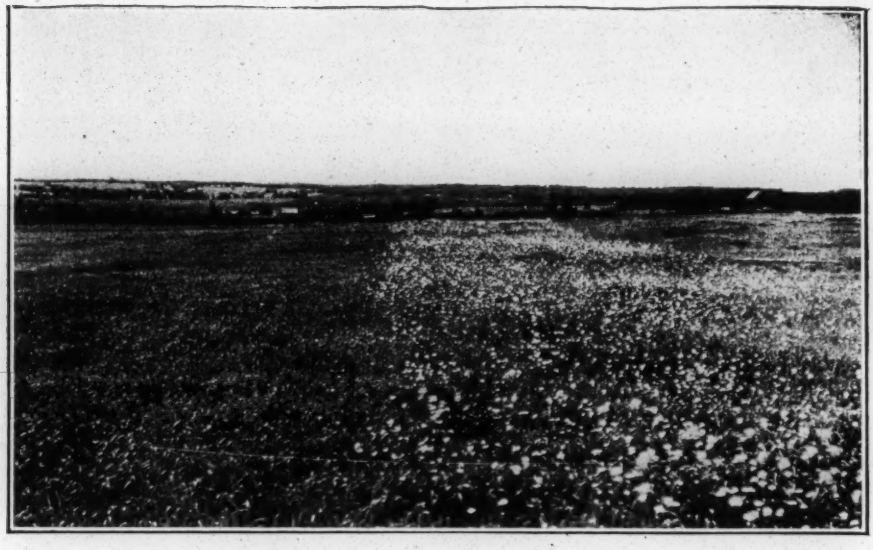
Members desiring to attend the annual banquet of the Society on December 14 are requested to send to the Society at once their names and the number of reservations desired. The price per plate is $5.00. The program for the evening has not been completed, but one of the features will be the presentation of the Hubbard Gold Medal to Captain Roald Amundsen, of Christiania, Norway.

Practically all of the following addresses will be printed in the NATIONAL GEOGRAPHIC MAGAZINE, 1907–1908.

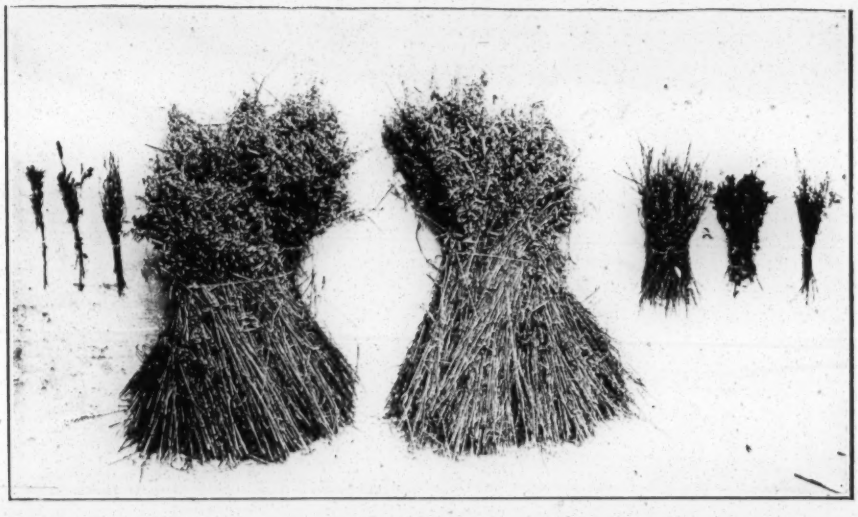
Friday, October 25, 1907—"The Tombs of Uaa and Tuaa and Queen Tiyi in the Valley of the Kings, at Thebes." Mr Theodore M. Davis, of Newport, R. I.

Friday, November 1, 1907—"The Northwest Passage." Captain Roald Amundsen, of Christiania, Norway. An account of the first successful passage around the north coast of North America from the Atlantic to the Pacific, a feat which had baffled the world for centuries. Illustrated.

Friday, November 15, 1907—"Peaks, Passes, and Glaciers." Prof. Charles E. Fay, of Tufts College, President American Alpine Club. With 100 illustrations from the unrivaled collection of mountain photographs by Signor Vittoria Sella. The Alps, the Caucasus, the Himalayas, and Alaska will be fully represented, and it is hoped that a few Sella photographs



Field to left sprayed; strip on right unsprayed (showing mustard plants in blossom three weeks after spraying)



On left, oats and weeds from three harvester bundles from treated plat; on right, same from untreated plat

Effect of spraying oat fields with iron sulphate solution for eradication of wild mustard. Wisconsin Station. Photos from U. S. Dep't of Agriculture

An Intermediate Type of Tomato, Nearly Seedless

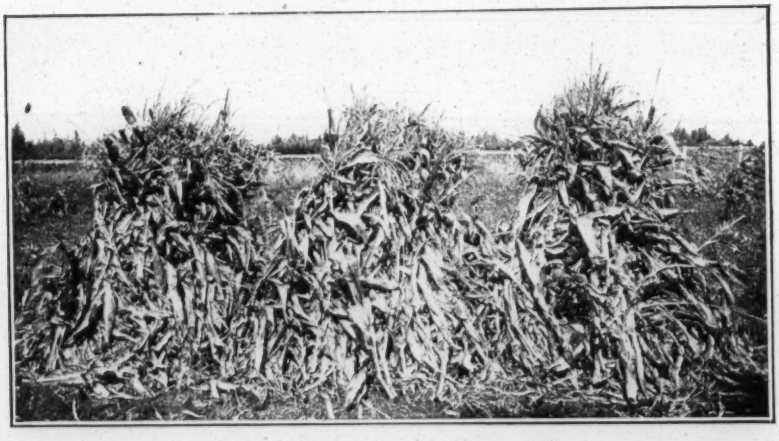
Modification brought about by high feeding. Form, size, and quality the best

Large Type Seedless Tomato

Both types were developed by the Wisconsin Experiment Station at Madison. Photos from U. S. Dep't of Agriculture

Corn grown on undrained field

Corn grown on field with tile drains 70 feet apart



Corn grown on field with tile drains 40 feet apart. Originally the wettest portion of the area

These illustrations of experiments at the Wisconsin Experiment Station, at Madison, are from the U. S. Dep't of Agriculture

from the recent expedition of the Duke of Abruzzi to Mount Ruwenzori, in equatorial Africa, may be received in time for the address.

Friday, November 22, 1907—"Through the Deserts of Lower California, Mexico." Mr E. W. Nelson, of the Biological Survey. Mr Nelson will describe a recent trip through this unexplored section of America for the United States Biological Survey. The most remarkable desert vegetation in the world, seen in Lower California, will be shown on slides.

Friday, November 29, 1907—"The Native Peoples of the Congo." Dr Frederick Starr, of the University of Chicago. Author of "Strange Peoples," "The Truth about the Congo," etc. Illustrated.

Friday, December 6, 1907—"The Panama Canal." Illustrated with moving pictures of the work. Mr C. L. Chester.

Friday, December 13, 1907—"The Land of the Incas." Mrs Harriet Chalmers Adams, author of "The City that was Exchanged for New York," "East Indians in the New World," in the NATIONAL GEOGRAPHIC MAGAZINE for June and July, 1907. Illustrated.

December 14, 1907—Annual Banquet. The New Willard.

Friday, December 20, 1907—"The Second Peace Conference at The Hague." Hon. John W. Foster, formerly Secretary of State.

Friday, January 3, 1908—"The Geography of Mars." Percival Lowell, LL.D., Director of the Lowell Observatory, of Flagstaff, Arizona. Illustrated.

Friday, January 10, 1908—"Two Thousand Miles on Muleback through the Andean Wonderland." Hon. John Barrett, Director of the International Bureau of American Republics. Illustrated.

Friday, January 17, 1908—"A Camel Trip in the Salt and Sand of Chinese Turkestan." Mr Ellsworth Huntington, of Yale University, author of "The Pulse of Asia." Mr Huntington was a member of the recent expedition of the Carnegie Institution to Central Asia and Turkestan, and had unusual opportunities to study this interesting region. Illustrated.

Friday, January 24, 1908—"The Pelicans of America: An Account of Field Studies of the White Pelican in the Western States and in Northwest Canada, and of the Brown Pelican in Florida." Mr Frank M. Chapman, of the American Museum of Natural History. Illustrated.

Friday, January 31, 1908—"The Conservation of Our Natural Resources." Mr Gifford Pinchot, Chief of the U. S. Forest Service.

Friday, February 7, 1908—"South Africa: The Natives and the Mines." Mr Gardiner F. Williams, author of "The Diamond Mines of South Africa" and for many years General Manager of the De Beers Diamond Mines, Kimberley. Illustrated.

Friday, February 14, 1908—"The Deep-water Route from Chicago to the Gulf and its Connections." Hon. Joseph E. Ransdell, Member of Congress from Louisiana and President of the Rivers and Harbors Congress.

Friday, February 21, 1908—Hon. George Shiras, 3rd, of Pittsburg, has accepted the invitation of the National Geographic Society to address the Society on some of his experiences in hunting wild game with the camera. Illustrated.

Friday, February 28, 1908—"Holland's War with the Sea." Prof. J. Howard Gore. Illustrated.

Friday, March 6, 1908—"The Missions of California." Hon. Joseph R. Knowland, Member of Congress from California.

Friday, March 13, 1908—"Arizona—The Egypt of the New World." Mr Frederick Monsen. Mr Monsen describes not only the ancient ruins, but the country as it is today, with its Indian tribes, Spanish-Mexican settlements, and American towns. The wonderful Snake Dance of the Hopis will be shown.

Friday, March 20, 1908—"Perisa—Past and Present." Dr A. V. Williams-Jackson, of Columbia University. Illustrated with unusual pictures taken by Professor Jackson on extensive journeys through the ancient kingdom.

Friday, March 27, 1908—"The Geography of the Sea." Rear Admiral Colby M. Chester, U. S. Navy.

Friday, April 3, 1908—"Cathedrals, Mosques, and Temples of the World." Hon. O. P. Austin, Chief U. S. Bureau of Statistics. Illustrated.

INLAND WATERWAYS

Several technical meetings to consider our inland waterways, and particularly the Mississippi and its tributaries, are being arranged.

BOOK REVIEW

The Savage South Seas. Painted by Norman H. Hardy. Described by E. Way Eklington. Pp. 204, 6½ by 9 inches. Illustrated with 68 full-page pictures in colors. New York: Macmillan Co. $6.00.

The beautiful illustrations printed in this volume give an admirable idea of the people and life in British New Guinea, in the Solomon Islands, and among the New Hebrides. Mr Hardy lived for some time in that fascinating part of the world and presents a realistic picture of the rich color of the South Seas. The volume is one of a series published by Adam and Charles Black, of England, describing the different parts of the world, each volume in the series being illustrated with many colored pictures.

Photo by Scott.

INDIAN WOMAN SPINNING WITH SPINDLE, LAKE CHAPALA. THE ANCIENT MOUND BUILDERS USED TO SPIN IN THE SAME WAY.

SCENES FROM EVERY LAND, which will come from the press not later than November tenth, has had a remarkable advance sale, more than three-quarters of the entire edition having been subscribed for in advance of the distribution. The fact that this volume, containing a collection of two hundred and fifty intensely interesting illustrations, together with a small chart of the world in five colors and a bibliography of the best books descriptive of foreign countries, natural history, and general geography, including gazetteers and atlases, will make an **Admirable Christmas Present** has presented itself strongly, and many are now ordering four and five copies of the publication with the view of presenting them as **Christmas Gifts.**

Copies bound in red leather with gilt tops may be had for $2.50, postpaid.

The volume has become very popular among the schools, not only in this country but abroad, the Principal of the Imperial High School of Tokyo having ordered twenty sent to Japan.

The volume is 7x10¼ inches, printed in brown duo tint ink, on the same superior paper used by the Magazine, and well bound in green buckram.

The price of this valuable and unique publication is $1.00 postpaid in the United States; $1.25 abroad.

Hon. O. P. Austin,
Secretary National Geographic Society,
Washington, D. C.:

Please send me_____ of "Scenes from Every Land," for which I enclose $1.00 per copy.

*Name*_____

*Street Address*_____

*City and State*_____

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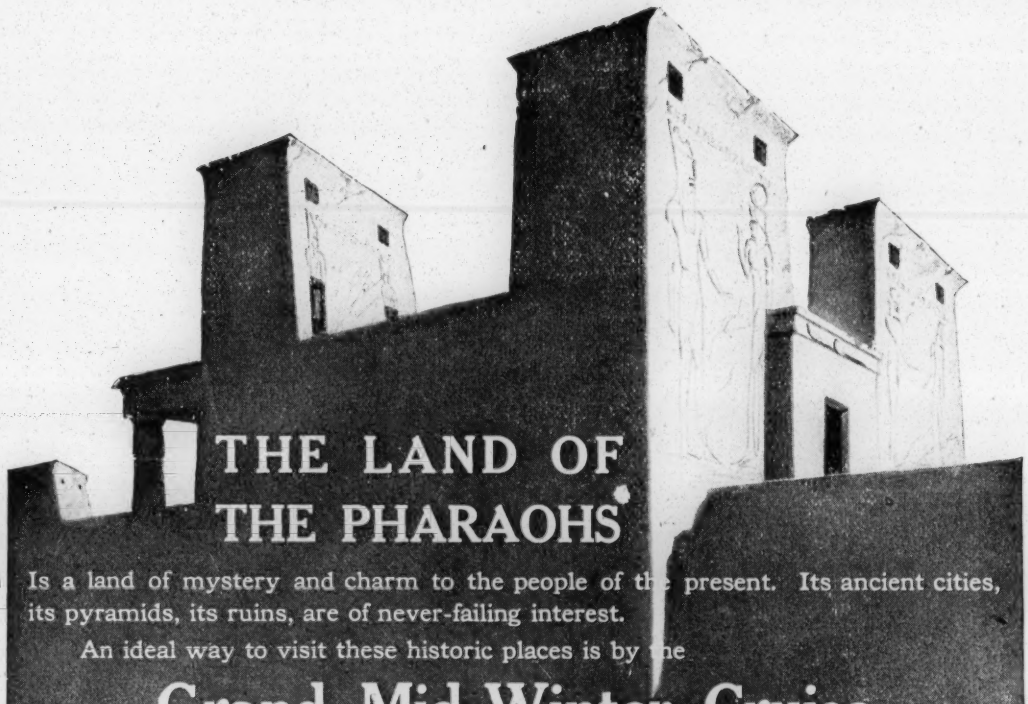

THE LAND OF THE PHARAOHS

Is a land of mystery and charm to the people of the present. Its ancient cities, its pyramids, its ruins, are of never-failing interest.

An ideal way to visit these historic places is by the

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of the magnificent twin-screw S. S. MOLTKE, leaving New York, January 29th, 1908, for the

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A voyage of over 15,000 miles and 79 days' duration for $300 and upward, including stateroom accommodations and meals. On this cruise the steamer calls at 23 ports and at nearly every port opportunity is given for inland trips.

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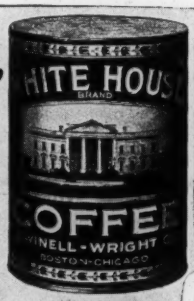

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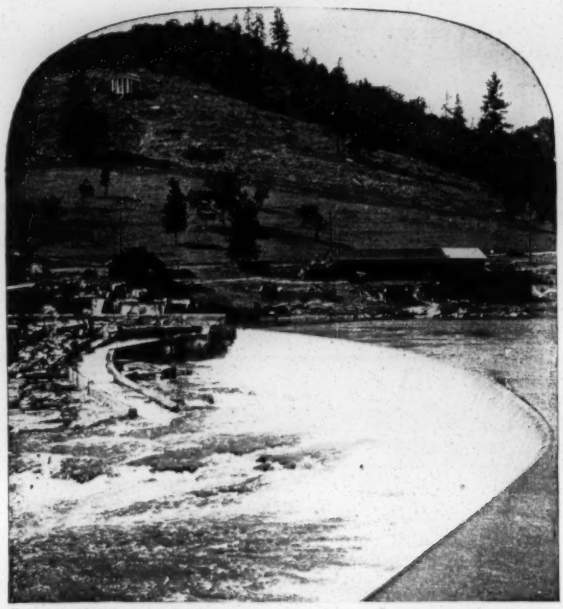

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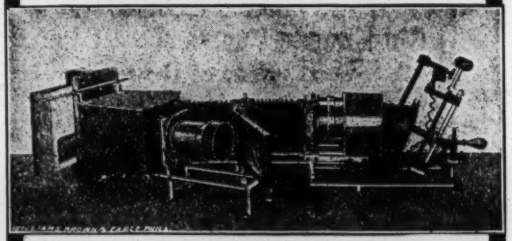

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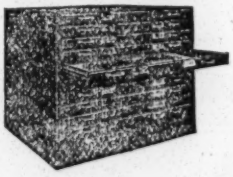

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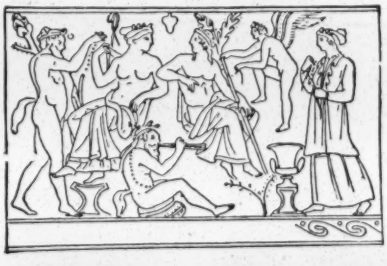

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